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# REPORT
OF
# HARBOR AND LAND COMMISSIONERS

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# 1908

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# THIRTIETH ANNUAL REPORT

OF THE

# BOARD OF HARBOR AND LAND COMMISSIONERS.

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FOR THE YEAR 1908.

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# Commonwealth of Massachusetts.

## REPORT.

*To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.*

The Board of Harbor and Land Commissioners, pursuant to the provisions of law, respectfully submits its annual report for the year 1908, covering a period of twelve months, from Nov. 30, 1907, being the thirtieth annual report of the Board since its establishment by chapter 263 of the Acts of 1879.

The present organization of the Board is as follows: George E. Smith of Swampscott, chairman, Samuel M. Mansfield of Boston, Heman A. Harding of Chatham.

From Dec. 1, 1907, to Nov. 30, 1908, the Board has given 158 formal and informal hearings, and has received 144 petitions for licenses to build and maintain structures and for privileges in tide waters, great ponds and Connecticut River, to dredge material, to remove material from beaches, and for other purposes.

One hundred and one licenses for structures and privileges in tide waters, great ponds and Connecticut River have been granted during the year; also 42 permits for dredging, for the removal of material from beaches, and for other purposes.

Inspections have been made at various times by and under the direction of the Board, of work completed and in progress; of sites of authorized work, under appropriations made by the Legislature; also upon petitions and plans presented of the sites of proposed work in tide waters; various structures built under licenses; sites of alleged dumping of material into tide

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waters; Connecticut River; great ponds; State boundaries; town boundary survey work.

Through transactions of the Board there has been paid into the treasury of the Commonwealth during the past year from sales, rents, licenses, leases and other sources, and credited to the Commonwealth's flats improvement fund and the harbor compensation fund for Boston harbor, the aggregate sum of $81,263.83.

During the year 14 contracts were made, involving the estimated expenditure of $218,164.39. A list of these contracts and those pending, with details relating thereto, may be found in the Appendix.

## Boston Harbor.

The work of deepening and widening the main channel by the United States is progressing favorably. The 35-foot channel will probably be dredged by June, 1909, to its full width of 1,200 feet in front of the Commonwealth pier. The Commonwealth will then complete the dredging from the easterly side of the pier to the channel, and there will be a large water area about 30 feet deep between the South Boston and East Boston piers.

In March, 1908, it was ascertained that the area in front of the Cunard pier had shoaled somewhat, and a contract was made to dredge the area between the pier and the main channel to a depth of 35 feet. The depth heretofore had been only 27 feet since the last dredging in 1895.

This work was completed July 18, 1908, covering an area of about 4 acres. The amount dredged was 72,876 cubic yards, at 28.8 cents per cubic yard, measured in scows, at a cost of $20,988.29.

Since the fire at these wharves the Cunard steamers have berthed at the Eastern Railroad pier, and the depth of water at the northwest in front of that pier is insufficient for the navigation of large steamships, but will be improved as soon as funds available will permit.

It is ascertained that there is some shoaling westerly of the main channel from India wharf northerly to Lewis wharf. Probably this shoaling extends along all the water front from Northern Avenue bridge to Charlestown bridge.

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This is due in part to the large amount of dredging in the upper harbor and tributaries and the settling of fine material raised by the dredges, and in part to other causes.

### Anchorage.

The basin authorized to be excavated by chapter 476 of the Acts of 1901 has been substantially completed, only the cleaning up of a few shoal spots remaining. The basin is about 1 mile in length and 1,000 feet in width, and contains about 126 acres dredged to a depth of 30 feet.

The amount of material dredged under the four contracts aggregates about 3,038,792 cubic yards.

Appropriations for this improvement have been made as follows: —

| | |
|---|---|
| Chapter 97, Resolves of 1900, . . . . . | $2,500 |
| Chapter 476, Acts of 1901, . . . . . | 1,000,000 |
| Total, . . . . . | $1,002,500 |

The amount expended during the year is $94,293.74.

The total amount expended on this project to Dec. 1, 1908, is $454,596.30.

### Bird Island Shoal.

The dredging of the westerly end of Bird Island Shoal which was in progress at the time of our last report was completed May 14, 1908. Dredging was done over an area of about 11.43 acres to a depth of 12 feet at mean low water. About 184,073 cubic yards were dredged, at 26 cents per cubic yard, at an aggregate cost of $45,778.98, of which sum $2,000 was contributed by the Simpson Patent Dry Dock Company and the Boston, Revere Beach & Lynn Railroad Company, and the balance from the income of the Harbor Compensation Fund.

### Commonwealth Flats at East Boston.

The action of owners of flats on the easterly shore of East Boston to recover the value of part of the land taken by the Commonwealth between Jeffries Point and Wood Island is still pending in the Supreme Judicial Court.

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The water front of East Boston will be the subject of a special report to the Legislature of the Board of Railroad Commissioners and the Board of Harbor and Land Commissioners, acting jointly.

### Commonwealth's Land and Flats at South Boston.

There has been no substantial change in this area. A full account of its history and condition was given in the last report of the Board, p. 17. A small lot of land on Anchor Street has been sold at $1.50 per foot.

The bulkhead easterly of the Commonwealth pier has been repaired at an expense of $795.

Incidentally the lands have been benefited from the dredging in front of the Commonwealth pier and in the Reserved Channel, as elsewhere reported.

Some 6,900 feet of water front is available for piers with warehouses in the rear, and railroad tracks could easily be extended thereto. This front and land is awaiting occupation by tenants who need wharves and docks of varying areas, to be leased for a term not exceeding fifteen years.

### Commonwealth Pier.

Small use has been made of this pier during the past year.

Inquiries have been made as to rental of small portions of the pier for discharging coal, for the building of a gasoline tank for supplying small motor boats and for the lobster business.

In each instance the area desired was small, the expected rental low, and the proposed use was likely to impair the value for larger commercial uses. The Northern Avenue bridge is opened for travel, and if the pier can now be connected by tracks with Atlantic Avenue, the hopes of the Commonwealth and of the commercial organizations of Boston for its use and occupation for navigation and commerce may be realized. At any rate, there will then be an immediate opportunity for such development if there is a demand for increased wharf accommodations centrally located.

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### Northern Avenue and Bridge.

The bridge has been completed, and was opened for travel Oct. 26, 1908.

The avenue is completed and opened from Atlantic Avenue to the bridge, and easterly of the bridge the paving has been completed a short distance towards the Commonwealth pier.

The plans for the bridge were approved by this Board, under the provisions of chapter 381 of the Acts of 1903, on July 18, 1904.

The bridge is 80 feet wide, with a draw opening 75 feet in the clear; the surface over the draw opening and between the trusses has two sidewalks, two traffic roadways, and in the center a space reserved and built for two railroad tracks. This bridge and avenue were built in compliance with the "four-part agreement," so called, made in 1873; and the Commonwealth had been struggling vigorously since March, 1898, to have the city of Boston complete its part of that contract, as is shown in the reports of this Board on that subject.

The struggle culminated in the mandatory act, chapter 381 of 1903. The Commonwealth paid $260,000 towards the cost of the bridge. It had agreed in 1873 with the city to pay about one-half that sum. It consented to pay the larger sum in order to expedite the use of its pier, which prominent city officials and business men had been so desirous in 1897 to have constructed by the Commonwealth for the benefit of the commerce of Boston.

The chief advantage to the commerce of Boston must come from the extension of railroad tracks from Atlantic Avenue over the bridge to the pier. It therefore came as a great surprise and a disappointment to those familiar with the history of the South Boston flats for fifty years and the building of the pier, when at the last moment the laying of tracks on the bridge was delayed or refused.

### Reserved Channel.

The work of deepening and widening a portion of the Reserved Channel at South Boston, under contract with George H. Breymann & Brothers, dated March 1, 1907, was completed

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Sept. 5, 1908, at a cost of $85,653.36, the contract price being 18 cents per cubic yard. The portion of the channel from the easterly end of the draw pier of L Street bridge to the angle in the channel near Lawley's yacht basin was dredged to a depth of 20 feet at mean low water and widened to 300 feet, and from said angle through the temporary channel, so called, to the main ship channel, was dredged to 20 feet at mean low water with a width of 200 feet.

The plan for this channel, providing for a width of 400 feet and a depth of 12 feet at mean low water, was approved by the Governor and Council in 1887, and was projected for the purpose of providing the riparian owners at South Boston access to the harbor, which would be curtailed by the filling of the Commonwealth flats. The owners of flats released certain claims against the Commonwealth, and the latter agreed to provide this channel.

The change in width and depth made by the above contract, approved by the Governor and Council, was demanded on account of the increased size of vessels using the channel.

On the northerly side of this channel the Commonwealth's frontage amounts to about 2,580 feet, on which a sea wall has been built in a location which will permit of building pile piers 300 feet in length for the accommodation of vessels and the transaction of such business as requires both land and water facilities. The Commonwealth has, however, built but one pile pier on this frontage, located above the L Street bridge, in which there is a draw opening of 39.5 feet. This pier, with 74,971 square feet of filled land, is now leased to the Staples Coal Company for $4,000 per annum and taxes.

Other pile piers will be built as soon as there is a demand for their use by lessees on reasonable terms.

### Angle Tree Monument.

By chapter 41 of the Resolves of 1908, an appropriation was made for the preservation of the "Angle Tree Monument" erected by the General Court in 1790 to mark the boundary between the provinces of Massachusetts Bay and Plymouth.

The monument is a slate stone slab, standing in the woods about one-quarter of a mile north of High Street in North Attle-

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borough. It is badly defaced, and chips have been broken from both faces.

The monument should be reset and a fence constructed to protect it. A private way should be dedicated or a town way laid out from High Street to the monument. The owner will probably give the necessary land or right of way, which the selectmen have undertaken to secure.

### Annisquam River.

The work on this river has been completed. The channel has been marked by beacons by the United States lighthouse authorities, and is very much used by pleasure craft in summer and by fishermen and others.

Complaints have been made to the Board that the channel is shoaling in places. That was to be expected. The channel was to be 50 feet wide on the bottom and 6 feet deep at mean low water. Part of the way the channel is through soft material and sand, and some places were dredged three times during the progress of the work. It is inevitable that the banks shall slough off and the channel shoal more or less. The Board has no appropriation for improving this channel.

Appropriations have been made as follows: —

| | |
|---|---|
| Chapter 71, Resolves of 1903, . . . . | $1,500 00 |
| Chapter 88, Resolves of 1904, . . . . | 50,000 00 |
| Chapter 95, Resolves of 1908, . . . . | 5,381 15 |
| Total, . . . . . | $56,881 15 |

The amount expended during the year is $5,857.78.

The total amount expended for the improvement of this river to Dec. 1, 1908, is $56,848.44.

### Back Bay Lands.

Upon petition of the Universalist Publishing House, owner of a lot of land on the northerly side of Boylston Street, between Arlington and Berkeley streets in Boston, sold by the Commonwealth in 1859, the Board, upon the receipt of adequate consideration, and upon approval of the Governor and Council, gave a release from the restriction in the original deed

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from the Commonwealth, prohibiting the use of any building erected on said land for *mercantile* purposes, believing that the objects for which the restriction was originally inserted had been fulfilled.

### Connecticut River.

No work has been done during the year under the contract, which was made Aug. 9, 1907, with Daniel O'Connell's Sons of Holyoke, for protecting the bank of the river with stone riprap on the northerly side of Hadley village.

During the year 1907 about one-half the work was done, but owing to the very low stage of the river during the summer of 1908, the contractor was unable to operate his scows.

It is anticipated that work will be commenced immediately after the spring floods of 1909 and completed during the summer.

A survey of the river was made in June, 1908, from which it appears that, while additional riprap is necessary, the high water and extensive ice jams of the spring of 1908 did comparatively little damage.

The work of protecting the westerly bank of the river near Calla Shasta Grove in Agawam, which was in progress at the date of the last report, has been completed to the southerly end of Calla Shasta Grove. The bank has been graded and covered with a layer of brush and stone for a length of 370 feet.

The appropriations for Agawam amount to $13,000, a balance of $1,603.05 remaining unexpended.

The appropriations for work on this river from 1888 to 1907 inclusive amount to $99,000.

The licenses of the Connecticut Valley Lumber Company to hang booms at Gill and Montague, and at Northampton, Holyoke, Hadley and South Hadley, were on petition of said company renewed in somewhat different form. A public hearing was given at Holyoke on July 29, 1908, at which the lumber and boating interests on the river were heard and considered.

The amount expended during the year is $1,464.19.

The total amount expended on this river to Dec. 1, 1908, is $91,629.97.

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### Cotuit Harbor.

By chapter 546 of the Acts of 1908, this Board was authorized and directed to improve Cotuit harbor in the town of Barnstable by removing rocks and by deepening the channel, and otherwise as it may deem expedient, the appropriation for this purpose being $5,000. This subject has been investigated, the harbor entrance examined, and parties in interest have expressed their views as to the best method of improvement. The Board, however, has not begun the work. If it should be concluded that the construction of a breakwater, as has been advocated, is what is required to improve the existing conditions, the appropriation is inadequate even to make a reasonable beginning.

### Cuttyhunk Harbor.

By chapter 450 of the Acts of 1905, the Board was instructed to dredge and otherwise improve this harbor. The plan of improvement adopted comprised the construction of two stone jetties, one on either side of the existing entrance, to confine the channel and direct it in such a manner as to force it to scour a deeper channel across the bar. This work, so far as the appropriation would allow, was completed in February, 1907, about 300 feet in length of the southerly jetty and about 1,025 feet of the northerly jetty having been built.

In 1907 a further appropriation of $7,500 was made, for improving this harbor by strengthening and extending these jetties, and by dredging a channel through the bar at the harbor entrance; and a contract for enlarging and extending these jetties was entered into on Aug. 2, 1907, with Thomas & Connor of Middleborough, the contract price being $2.54 per ton for stone furnished and placed.

This work was completed Oct. 28, 1908, at a cost of $10,473, the jetties having been built up to about 2 feet above mean high water, the northerly one extended a few feet and the southerly one about 200 feet, which brings the outer end of each jetty about to the summit of the bar at the entrance to the channel.

It is too early as yet to determine to what extent the construction of these jetties will improve the channel, but it ap-

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pears to have resulted in a slight deepening and widening of the channel, and the depth of 4 feet at mean low water may yet be obtained.

By chapter 142 of the Resolves of 1908, a further appropriation of $7,500 was made for improving this harbor. Specifications for dredging were prepared and the work advertised. Only one proposal was received, and, this being deemed excessive in price, was rejected.

A map of this harbor was printed with the report of the Board for the year 1900.

Appropriations for this harbor are as follows: —

| | |
|---|---|
| Chapter 33, Resolves of 1900, | $1,000 |
| Chapter 450, Acts of 1905, | 5,000 |
| Chapter 452, Acts of 1907, | 7,500 |
| Chapter 142, Resolves of 1908, | 7,500 |
| Total, | $21,000 |

The amount expended during the year is $10,003.95.

The total amount expended in connection with this harbor to Dec. 1, 1908, is $14,694.43.

### Deacons Pond, Falmouth.

By chapter 461 of the Acts of 1906, an expenditure of $25,000 was authorized for building jetties and dredging an entrance channel and basin at Deacons Pond, and building a boat harbor by connecting the water of said pond and Vineyard Sound. This act also provided that the work of construction should not be commenced until $10,000 shall have been paid into the treasury of the Commonwealth by the town of Falmouth, in accordance with the provisions of chapter 69 of the Acts of 1906. This payment was made in January, 1908. By chapter 495 of the Acts of 1907, the time within which expenditure may be made from the State treasury for improving this pond is extended for two years, so that $25,000 may be expended in 1907, 1908 or 1909.

Releases have been obtained from some of the shore owners, and a purchase was made of Mrs. Davis to the cost of which the citizens voluntarily contributed $1,000; and in February, 1908,

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a taking of land was made and proposals for doing the necessary work received.

On Feb. 24, 1908, a contract was entered into with John R. Burke for dredging a channel from the sound into this pond and excavating an area in said pond for an anchorage basin; also for building two stone jetties, the entrance channel to be 150 feet wide on the bottom and 7 feet deep at mean low water, the anchorage basin to be about 7 feet deep at mean low water over an area of about 4 acres above the highway, formerly Clinton Avenue, but now discontinued by the town. The contract prices are as follows: for large stone furnished and placed in the jetties, $2.05 per ton; for small stone furnished and placed as riprap on the banks of the channel and in the cores of the jetties, $1.80 per ton; for dredging, 22 7/10 cents per cubic yard, measured in scows.

It is expected the work will be completed early in the coming season.

Appropriations: —

| | |
|---|---|
| Chapter 495, Acts of 1907, . . . . . | $25,000 |
| January, 1908, deposit with the Treasurer by town of Falmouth, . . . . . | 10,000 |
| Total, . . . . . | $35,000 |

The amount expended during the year is $21,456.49.

The total amount expended to Dec. 1, 1908, is $21,463.49.

### Dredging Easterly Shore of Dorchester.

The anchorage basin heretofore dredged to a depth of 9 feet at mean low water in Dorchester Bay near Commercial Point has been enlarged this year.

On May 18, 1908, a contract was entered into with J. P. O'Riorden to enlarge the anchorage basin in Dorchester Bay, between Savin Hill and Commercial Point, by dredging, to the depth of 9 feet at mean low water, two areas, the first about 1,100 feet long and 265 feet wide, lying northwest of the present channel and extending between the anchorage basin dredged by the Commonwealth in 1904 and the channel dredged by the Savin Hill Yacht Club in 1907, the northerly limit being

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165 feet inside of and parallel to the harbor line; the second a triangular area at the intersection of the channel dredged by the Commonwealth in 1904 and the anchorage basin dredged in 1907, — the estimated amount of material to be removed being about 100,000 cubic yards, scow measurement. Up to Dec. 1, 1908, about 45,343 cubic yards have been removed.

Appropriations for work in this locality have been made as follows: —

| | |
|---|---|
| Chapter 439, Acts of 1903, | $25,000 |
| Chapter 453, Acts of 1905, | 10,000 |
| Chapter 454, Acts of 1906, | 10,000 |
| Chapter 488, Acts of 1907, | 25,000 |
| Total, | $70,000 |

The amount expended during the year is $3,211.47.

The total amount expended in this locality to Dec. 1, 1908, is $48,347.66.

### East Bay, Osterville.

By chapter 115 of the Resolves of 1908, an appropriation of $10,000 was made for improving East Bay harbor at Osterville, in the town of Barnstable, by dredging or otherwise.

The improvement of this harbor was commenced in 1903 by building two stone jetties, excavating a new outlet to the plane of mean low water between those jetties, and closing the old outlet by a sand embankment.

Since this was done, the current has scoured out between the jetties a channel 3 feet or more in depth, but the available depth within the harbor for boats entering it was much less.

After the jetties were built, it was found that the sea was wearing away and weakening the sand beach to the eastward, and this has been protected from time to time by small amounts of stone riprap.

Under the above resolve it was planned to excavate a channel 150 feet wide and 4 feet deep at mean low water, from the channel between the jetties into the deep water on the northerly side of the bay, depositing the material on the narrow beach to the east of the jetties and thereby strengthening it; also to

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dredge the channel between the jetties to a width of 100 feet and a depth of 4 feet at mean low water into Nantucket Sound.

A contract was made with Messrs. Cavanagh Brothers of Boston to excavate the last described channels, which requires the removal of 18,500 cubic yards, for the sum of $7,000. This work is now in progress.

The stone riprap for the further protection of the shore will be done some time during the coming winter.

Appropriations: —

| | |
|---|---|
| Chapter 96, Resolves of 1899 (including Witchmere harbor and Lewis bay), | $1,500 |
| Chapter 376, Acts of 1903, | 6,500 |
| Chapter 115, Resolves of 1908, | 10,000 |
| Total, | $18,000 |

The amount expended during the year is $2,698.10.

The total amount expended to Dec. 1, 1908, is $11,550.38.

## Essex River.

By chapter 125 of the Resolves of 1908, the sum of $5,000 was appropriated for the improvement of this river, a like amount having been appropriated by the Congress of the United States.

The $5,000 has been paid to the Secretary of War, and the improvement will shortly be undertaken.

## Fall River-Somerset Bridge.

The work of the Railroad Commissioners, Harbor and Land Commissioners and County Commissioners of Bristol County, constituted a Joint Board, by chapter 462 of the Acts of 1903, to locate and construct a drawbridge over Taunton Great River, which was in progress at the time of the last report, was completed the last of September, 1908. The abutments, piers, draw, superstructure and approaches all appeared to be in good condition.

The work was carried forward and completed by the contractors in a prompt and satisfactory manner. The bridge is

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a substantial and artistic structure, and adequate to accommodate the increasing travel.

The act limited the cost of the bridge to $1,000,000, and the Joint Board kept well within that sum.

On Oct. 5, 1908, the Joint Board filed in the office of the clerk of the Superior Court for the county of Bristol a statement, in detail, of the cost of the bridge, and a decree appointing the county of Bristol and its duly elected officers, the County Commissioners, to have the care and custody thereof, as is provided in section 5, pending the distribution of the cost by a special commission to be hereafter appointed by the Superior Court.

The cost of the bridge to Oct. 5, 1908, was $854,047.36.

Assessments of damages for land taken, petitions for which are pending in the Superior Court, and a few small bills not adjusted, will add to the above cost a few thousand dollars.

The bridge was opened before these last payments were adjusted, in order to facilitate public travel.

### Farm Pond, Sherborn.

By chapter 466 of the Acts of 1908, section 6, the Board was directed to fix the elevation of high water in Farm Pond, as established by said act, with reference to some suitable permanent base, to record the same in the registry of deeds of the Middlesex South District, and to file a copy of the document so recorded with the trustees of the Medfield Insane Asylum and with the State Board of Health.

Bench marks, to serve as permanent bases, were established in September, 1908, and duly recorded and filed.

### Herring River Dike, Wellfleet.

By chapter 183 of the Acts of 1908, the Board was authorized and directed to construct a dike, with ditches and structures incident thereto, at or near the mouth of Herring River, Wellfleet, and to expend for the construction of said dike and other works $10,000, in addition to $10,000 to be provided by the town of Wellfleet. This act is in substitution for chapter 511 of the Acts of 1907.

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On April 24, 1908, a contract was entered into with Thomas & Connor of Middleborough to build this dike, the contract price being $16,250.

The plans for a fishway through the dike were approved May 1, 1908, by the Commissioners on Fisheries and Game. The tide-gates, frame and sluice-gate were purchased for $674.

Owing to delay in receiving the approval of the Secretary of War, the contract was not approved until July 15, 1908. The work was then commenced, but has proceeded much more slowly than was anticipated. The Board hoped that the work could be completed early in the winter, but the high wind during the fall has so delayed the delivery of material that it was finally decided to discontinue it until spring.

Nothing has as yet been done towards cutting the ditches necessary to draining the marshes. This will have to be postponed until another season.

The appropriations for this improvement are as follows: —

| | |
|---|---|
| Chapter 183, Acts of 1908, . . . . . | $10,000 |
| By the town of Wellfleet, . . . . . | 10,000 |
| Total, . . . . . | $20,000 |

The amount expended during the year is $7,302.97.

The total expenditure to Dec. 1, 1908, is $7,604.08.

## Hingham Harbor.

By chapter 109 of the Resolves of 1908, the Board was authorized and directed to dredge an anchorage basin to the depth of 6 feet at mean low water at an expense of $5,000.

The parties interested desired to locate the basin opposite Thompson's wharf, just below the yacht club house. The area to be excavated for the basin is about 600 by 300 feet. A channel, 1,000 feet long from the basin to the end of the existing channel, 6 feet deep and 75 feet wide, would be required, or the basin would be of little use.

The basin and channel would require excavation of about —

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| | |
|---|---|
| 62,000 cubic yards, at 35 cents, | $21,700 |
| Supervision and incidental expenses, | 2,000 |
| Total, | $23,700 |

The appropriation was so small that it was decided to do nothing.

### Ipswich River.

In 1906 and 1907 the channel through the shoal at the mouth of this river was dredged to 6 feet at mean low water, while the channel through the shoal at Neck Creek and through the bar near the "Horse Shoe Curve" was dredged to over 5 feet at mean low water, at a total cost of $5,193.42. In 1907, under an appropriation of $3,000 made in that year, the balance of the channel through the shoal between "Horse Shoe Curve" and "Old Maid's Bank" was dredged to 5 feet at mean low water and 60 feet wide on the bottom, at a total cost of $2,999.84. The work done thus far did not complete the improvement of the river as originally planned by this Board.

By chapter 101 of the Resolves of 1908, a further appropriation of $3,000 was made, and a contract was entered into on July 20, 1908, with the Bay State Dredging Company, to widen the channel of the river by dredging the southerly bank opposite Barras Banks, the excavation to be about 500 feet long and 5 feet deep at mean low water, with a general width of 60 feet on the bottom, and a slightly greater width at the bend. The contract price was 45 cents per cubic yard, measured in scows.

This work was completed Aug. 8, 1908, at a total cost, including supervision, of $2,995.30.

Appropriations for dredging this river were made as follows: —

| | |
|---|---|
| Chapter 473, Acts of 1906, | $5,000 |
| Chapter 509, Acts of 1907, | 3,000 |
| Chapter 101, Resolves of 1908, | 3,000 |
| Total, | $11,000 |

The amount expended during the year is $3,591.10.

The total amount expended for improvements to Dec. 1, 1908, is $11,188.56.

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### Lynn Harbor.

By chapter 110 of the Resolves of 1908, the Board was authorized and directed to dredge an anchorage basin east of the main channel and outside the proposed location of Market Street. After an examination of the location the Board invited the mayor, the city engineer and other leading citizens to a conference on July 10, 1908. It appeared that besides the Market Street extension, which has since been commenced by the city, there was under careful consideration a project to build a bulkhead across the flats, dredge in front and use the material to fill the flats in the rear, thereby making a large area of land for manufacturing and other purposes, with wharves and a wide channel in front of the bulkhead.

This general project seemed practicable from an engineering point of view, and was being investigated. If the large development should be undertaken by the city, the basin would be behind the proposed bulkhead and wharves, therefore the Board considered it expedient to delay the dredging.

### Manchester Harbor.

The dredging in this harbor authorized by chapter 126 of the Resolves of 1907, and commenced in November, 1907, under contract with the Eastern Dredging Company, dated Oct. 18, 1907, was completed Jan. 3, 1908.

The channel between Point of Rocks and the railroad bridge, within the lines of the survey made by the United States Engineers, a distance of about 1,800 feet, has been dredged 75 feet wide on the bottom and 6 feet deep at mean low water, at a total cost of $7,977.84.

Appropriation for this harbor, by chapter 126, Resolves of 1907, $8,000.

In addition to this amount, the town of Manchester appropriated $2,500, which was expended in dredging the channel above the railroad bridge.

The total amount expended for the improvement of this harbor to Dec. 1, 1908, is $8,128.58.

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### Massachusetts-Connecticut Boundary Line.

On Dec. 31, 1907, the Board sent to the Secretary of the Commonwealth for record five plans and printed description of the line, as shown in the report of this Board for 1907 (p. 106), all duly signed by the Commissioners of Connecticut and Massachusetts. The line is now fully shown and well marked.

### Menamsha Inlet.

The work of improving Menamsha Inlet by strengthening the stone jetties, riprapping the banks of the channel and excavating the channel and anchorage basin to a depth of 5 feet at mean low water, which was in progress at the time of our last report, has been completed.

Under this contract, 44,291 cubic yards of material were excavated from the channel and anchorage basin and deposited at sea; 4,112 tons of stone were placed in the jetties and as riprap on the banks of the channel; and one large bowlder, which obstructed the inner end of the channel, was removed.

Owing to the strong current, which flows through the harbor from the large pond above, bringing down considerable quantities of sand, the area excavated was not as large as planned, but the work done has resulted in a material improvement.

Appropriations: —

| | |
|---|---|
| Chapter 323, Acts of 1897, . . . . . | $2,000 |
| Chapter 357, Acts of 1898, . . . . . | 2,000 |
| Chapter 133, Acts of 1899, . . . . . | 5,000 |
| Chapter 394, Acts of 1903, . . . . . | 10,000 |
| Chapter 90, Resolves of 1906, . . . . . | 25,000 |
| Total, . . . . . | $44,000 |

The amount expended during the year is $8,331.30.

The total amount expended to Dec. 1, 1908, is $45,673.30.

### Nantucket Harbor.

The work, under contract made in 1907, for dredging an area 500 feet square to a depth of 12 feet at mean low water north and east of the steamboat wharf, was commenced early in

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May, 1908, and completed August 5, 37,137 cubic yards of material being excavated and deposited at sea.

Appropriations: —

| | |
|---|---|
| Chapter 451, Acts of 1905, | $5,000 |
| Chapter 453, Acts of 1906, | 5,000 |
| Chapter 508, Acts of 1907, | 5,000 |
| Total, | $15,000 |

The amount expended during the year is $9,980.24.

The total amount expended to Dec. 1, 1908, is $15,930.30.

## Oak Bluffs.

By chapter 104 of the Resolves of 1908, the Board was directed to remove the ledge or rocks near the outer end of the public pier at Oak Bluffs.

It was found that two large bowlders were situated within 25 feet of the end of the pier, where they were an obstruction to boats approaching the landing. A number of smaller rocks lay on the bottom within a radius of about 50 feet from the end of the pier.

On Aug. 3, 1908, an agreement was made with Herbert N. Hinckley of Vineyard Haven to remove to the level of the surrounding bottom all the rocks within 50 feet of the outer end of the pier, for the sum of $462.50. This work was completed August 13, the rocks having been broken up with explosives and the fragments buried below the surface of the surrounding sand.

Appropriation: —

| | |
|---|---|
| Chapter 104 of the Resolves of 1908, | $500 |

The amount expended to Dec. 1, 1908, is $462.50.

## Penikese Island.

By chapter 118 of the Resolves of 1908, the Board was authorized and directed to build a pile wharf at Penikese Island in Buzzards Bay in extension of the present stone wharf on the

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easterly side of the main part of said island, the appropriation therefor being $5,000.

On Aug. 3, 1908, a contract was entered into with the Cahill Construction Company to build this wharf and complete the same on or before Nov. 1, 1908, the contract price being $4,490.

Owing in part to the difficulty experienced in driving piles in the sand and gravel composing the bottom, the work has been delayed, so that up to Dec. 1, 1908, only about one-half of the work has been done. The resolve aforesaid provides that upon the completion of this wharf it shall be turned over to and be under the control of the State Board of Charity.

Appropriation for this island has been made as follows: —

| | |
|---|---|
| Chapter 118, Resolves of 1908, . . . . . | $5,000 |

The amount expended during the year is $128.38, which is also the total expenditure to Dec. 1, 1908.

### Plymouth Harbor.

By chapter 531 of the Acts of 1907, the Board was directed to dredge a channel in Plymouth harbor, from the Cow Yard to the wharf of the Plymouth Cordage Company, substantially in accordance with the plan accompanying the report of the Board to the Legislature for the year 1906, the cost of said work up to the sum of $160,000 to be paid, one-half by the Commonwealth and one-half by the town of Plymouth.

Satisfactory arrangements having been made for the payment to the Commonwealth of the proportion of the cost to be paid by the town, a contract was made Sept. 4, 1908, with the Eastern Dredging Company, to dredge a channel substantially on the lines outlined in the above-mentioned report, the portion through the bar near the Cow Yard — about 1,100 feet in length — to be 250 feet wide and 20 feet deep at mean low water, while the main portion, about 5,000 feet in length, extending from the deep water back of the bar to the wharf of the Plymouth Cordage Company, is to be 150 feet wide and 18 feet deep at mean low water, — the contract price for the work being 16.7 cents per cubic yard, scow measurement, and $120 each for eight oak

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pile dolphins, which are to be constructed to mark the line of the channel.

The work has just been commenced, and is to be completed Oct. 1, 1910.

### Province Lands.

The work of planting beach grass and shrubs to hold the drifting sands has been continued substantially as heretofore. (See last report, p. 96.)

Efforts to exterminate the brown-tail moths were continued.

Brush obtained from the wooded portion of the lands was used in covering about 8 acres of sand.

About 38,000 seedling pines, taken from the adjacent woods, were transplanted, and about 850 pines with sod were planted, which show a favorable growth, considering the summer drought. About 4,000 hills of Scotch broom were transplanted, which show a good growth and form an excellent sand binder.

About 25 acres of beach grass were transplanted, and among this is considerable bayberry.

The remaining portion of the uncovered sand dunes amounts to approximately 150 acres.

The State road is now in excellent repair.

The Treasurer has received $156.56 from various persons for permits issued to raise cranberries or mow meadows.

Appropriations: —

| | |
|---|---|
| 1893–1905 inclusive, aggregate, . . . . . | $48,000 |
| Chapter 545 of the Acts of 1908, . . . . . | 10,000 |
| Total, . . . . . | $58,000 |

The amount expended during the year is $2,609.

The total amount expended to Dec. 1, 1908, is $48,083.24.

### Revere Breakwater.

The only work done since the date of the last report has been the placing of one cargo, consisting of 165 tons of stone. The vessel which brought this stone was used for removing a portion of the half-tide rock and other bowlders within the anchorage area, which is protected by the breakwater.

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An examination of the breakwater was made early in the summer, and it was found that the outer end for a distance of about 600 feet had settled from 1 to 6 feet, and a few of the stones had been displaced. About $1,000 of the appropriation had been retained to replace such stones and any small settlements which it was expected would occur. The actual settlement was largely in excess of what was anticipated, and it will require $3,000 in addition to the original appropriation to bring the existing length of breakwater up to its projected height. The amount still unexpended will be used for this purpose, but will be insufficient to raise the full length.

Appropriations: —

| | |
|---|---|
| Chapter 108, Resolves of 1905, | $25,000 |
| Chapter 99, Resolves of 1906, | 30,000 |
| Total, | $55,000 |

The amount expended during the year is $10,000.

The total amount expended to Dec. 1, 1908, is $44,571.69.

## Rock Harbor.

On Aug. 5, 1907, a contract was entered into with John H. Gerrish for excavating the channel of Rock Creek in the towns of Orleans and Eastham, under authority of chapter 116 of the Resolves of 1907, the contract price being $5,000. Work was commenced with a hydraulic dredge in June, 1908, but it was found impracticable to use the dredge in the narrow creek, and the contractor was forced to abandon this method. Work was recommenced in October, 1908, by using teams, and is now actively progressing. It is anticipated that the project will be completed in the spring of next year.

Up to Dec. 1, 1908, about one-seventh of the work has been done.

Appropriations for this harbor have been made as follows: —

| | |
|---|---|
| Chapter 25, Resolves of 1907, | $200 |
| Chapter 116, Resolves of 1907, | 5,000 |
| Total, | $5,200 |

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The amount expended during the year is $436.60.

The total amount expended for the improvement of this harbor to Dec. 1, 1908, is $621.06.

### Rockport Harbor.

By chapter 105 of the Resolves of 1908, the Board is authorized and directed to improve this harbor by deepening and enlarging the anchorage area and the approach to the wharves by dredging and removing rocks in such manner as the Board may deem best. The appropriation is $8,000. As the result of an examination of this harbor and study of the plan of survey made by the United States Engineer in 1899, it was decided that the greatest improvement could be effected by removing the rocks which projected above the surface of the bottom over an area on the northerly side of the harbor between the new wharf, so called, and Bear Skin Neck breakwater. This is the portion of the harbor which is most thoroughly protected and offers the best anchorage, except that it is seriously obstructed by the rocks referred to.

On Sept. 14, 1908, the necessary release from the owner of certain flats having been obtained, a contract was entered into with Thomas Fitzgibbon to remove rocks from the area above described, the contract price being $3.98 for each ton of stone removed. The work was completed Nov. 30, 1908, 1,756 tons having been removed, at a total cost, including supervision and incidental expenses, of $7,320.25.

Appropriation for this harbor has been made as follows: —

| | |
|---|---|
| Chapter 105, Resolves of 1908, . . . . . | $8,000 |

### Scituate.

Since 1900 many appropriations have been made for and expended along the Scituate shore in building bulkheads. This bulkhead and riprap work has had no relation to the navigation of boats, but is intended to prevent or control the movements of sand and the washing away of land along this exposed and sandy shore. The results have been the possible protection of a short length of country road, and the protecting and improving of certain front yards along the beach.

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The contract in progress at the southerly end of the Third Cliff and described in the last report of this Board (page 72) has been completed. Under this contract 1,038 tons of stone have been furnished and placed in position, and 221 lineal feet of riprap is completed, at a cost of $2,020.

On April 22, 1908, a contract was made with Messrs. McHale & Perkins for building two sections of concrete sea wall at North Scituate, one along the beach south of and adjoining Beach Street, the other in extension southerly of the wall previously built near Surfside Road. This work was completed on June 15, 1908, 280.54 lineal feet of wall having been built near Surfside Road and 369.52 lineal feet near Beach Street, at a cost of $3,977.35.

Appropriations: —

| | |
|---|---|
| Chapter 434, Acts of 1900, . . . . . | $15,000 |
| Chapter 496, Acts of 1906, . . . . . | 15,800 |
| Chapter 544, Acts of 1907, . . . . . | 6,000 |
| Total, . . . . . | $36,800 |

The amount expended during the year is $5,997.65.

The total amount expended along the Scituate shore up to Dec. 1, 1908, is $35,749.26.

### Scorton Harbor.

In the spring of 1908 an examination was made of Scorton harbor, formed by Scorton River, a small stream in the northwesterly portion of Sandwich, emptying into Massachusetts Bay. The previous fall a new channel had been cut across the beach, and its easterly bank protected for about 200 feet with granite quarry grout, under authority of chapter 516 of the Acts of 1907.

It was found that the high sand ridges thrown up by the dredge had been almost wholly washed away, and that the channel was being maintained about 30 feet wide, with its bottom at about the level of mean low tide. The old outlet had been closed by an embankment of sand thrown across it by the sea, forming a basin into which the tide ebbed and flowed to and from the new channel. The drift of sand from the west was too great for the tidal currents of the river to scour and main-

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tain a greater channel than as above stated, and it was decided to expend the balance of the appropriation in extending and strengthening the riprap protection to the east bank of the channel. One hundred and forty tons of quarry grout were furnished and placed on the easterly bank of the channel, and a portion of the grout already there was shifted so as to be more effective in protecting the bank.

The total cost of this additional work, including the removal of stones which had been washed down into the channel from the riprap, amounted to $370.

Appropriations for this harbor have been made as follows: —

| | |
|---|---|
| Chapter 442, Acts of 1898, | $5,000 |
| Chapter 516, Acts of 1907, | 10,000 |
| Total, | $15,000 |

The amount expended during the year is $1,971.92.

The total amount expended for the improvement of this harbor to Dec. 1, 1908, is $12,916.65.

## Sesuit Harbor.

By chapter 557 of the Acts of 1908, the Board was authorized and directed to construct a jetty at Sesuit harbor in East Dennis.

Plans for this improvement were made and reported to the Legislature of 1908, in which the cost was estimated at from $20,000 to $25,000. The release of damage claims from shore owners was obtained.

On Oct. 26, 1908, a contract was made with William Sears of East Dennis to build about 700 feet of the inner portion of the stone jetty, the contract price being $1.90 per ton. It is expected that work will be commenced during the winter.

Appropriations: —

| | |
|---|---|
| Chapter 32, Resolves of 1907, | $200 |
| Chapter 557, Acts of 1908, | 10,000 |
| Total, | $10,200 |

The amount expended during the year is $19.25.

The total amount expended to Dec. 1, 1908, is $201.50.

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### South River, Salem.

Since the date of the last report, the sum of $3,000 has been contributed and deposited with the Commonwealth, under the provisions of chapter 111 of the Resolves of 1907, and releases of claims for damages from the property owners abutting on the portion of the river to be excavated have also been received.

Plans and specifications for dredging the river to the depth of 8 feet at mean low water, from a point 200 feet below Union Street bridge to the westerly boundary of the Salem Electric Lighting Company's premises, — a distance of about 1,300 feet, — have been prepared and bids for doing the work invited.

Appropriations: —

| | |
|---|---|
| Chapter 111, Resolves of 1907, . . . . . | $5,000 |
| Deposit with State Treasurer, . . . . . | 3,000 |
| Total, . . . . . | $8,000 |

No expenditure has been made during the year.

The total amount expended to Dec. 1, 1908, is $158.66, paid from the appropriation for survey and improvement of harbors.

### Stage Harbor, Chatham.

The work in progress at the time of the last report has been completed. The condition of the harbor remains substantially the same as last year.

The amount expended during the year is $1,087.41.

The total amount expended to Dec. 1, 1908, is $9,231.93.

### Surveys of Sundry Harbors.

By chapter 106 of the Resolves of 1908, the Board was authorized and directed to make such surveys and investigations as it may deem necessary of the harbors and rivers hereinafter named, with a view to improving the same; to expend for the purpose of the resolve not exceeding $2,000, and to report to the next General Court, with estimates of the cost of any improvements which it may recommend hereunder. The Board reports as follows: —

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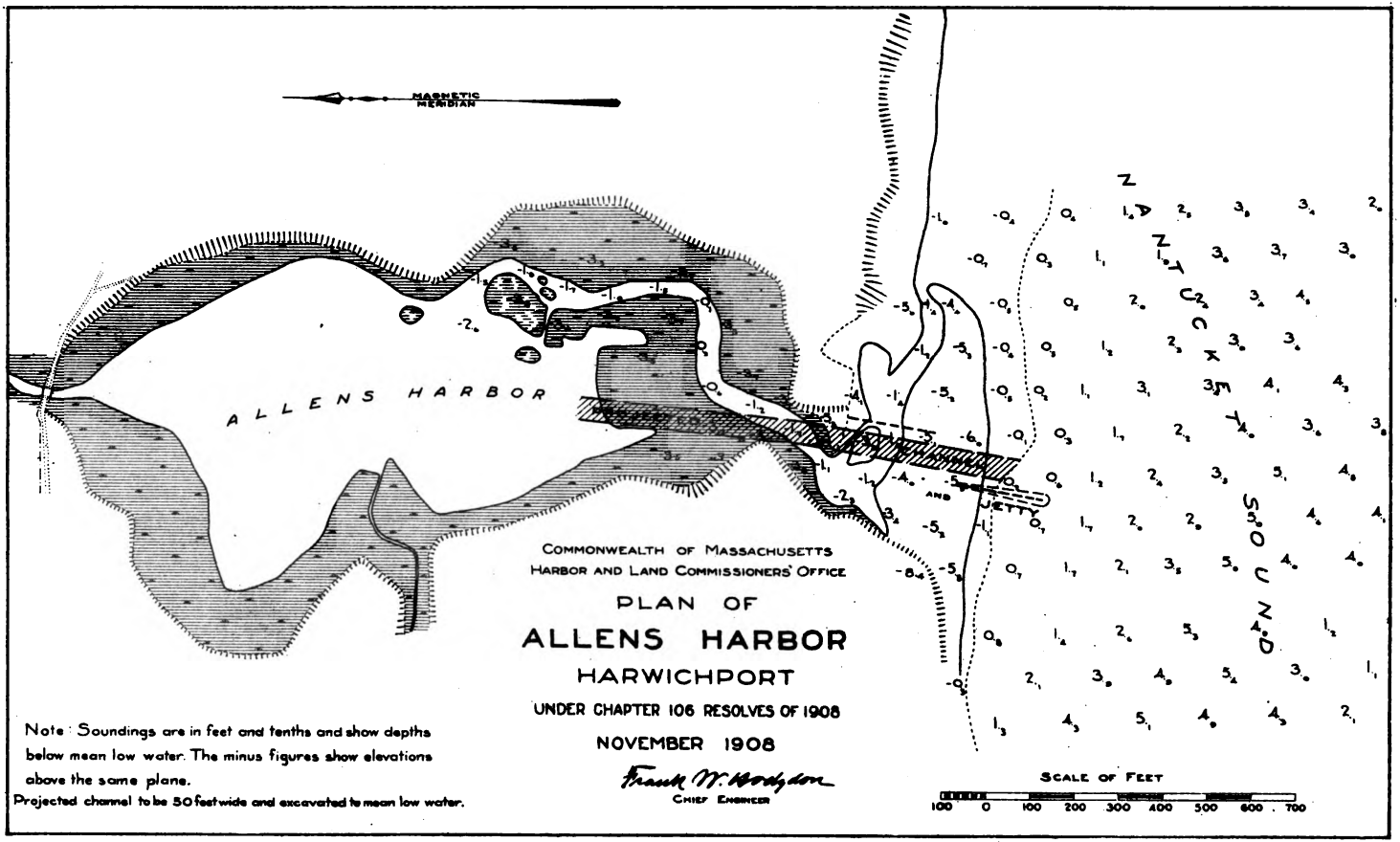


COMMONWEALTH OF MASSACHUSETTS
HARBOR AND LAND COMMISSIONERS' OFFICE

# PLAN OF ALLENS HARBOR HARWICHPORT

UNDER CHAPTER 106 RESOLVES OF 1908

NOVEMBER 1908

Frank M. Hodgdon
CHIEF ENGINEER

Note: Soundings are in feet and tenths and show depths below mean low water. The minus figures show elevations above the same plane.
Projected channel to be 50 feet wide and excavated to mean low water.

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### 1. *Barnstable Harbor.*

The improvement desired here is the excavation of a channel from the deep water of the harbor to the landing in Maraspin Creek, where the wharf is located at the end of the street leading into the village. This is about one-half mile from the deep water in the harbor, and over nearly the whole distance the flats run dry at low tide.

The survey covered the creek and flats in front of it, and the projected improvement is the dredging of a channel 100 feet wide on the bottom and 5 feet deep at mean low water from the deep water in the harbor up to the landing in the creek. There are two landings in the creek, one at the location of an old wharf and fish-house, and the other about 400 feet farther up the creek near the bridge, which carries the highway over the creek.

The amount of excavation required for dredging up to the lower landing is 68,500 cubic yards, and from the lower landing to the upper one 18,300 cubic yards.

The estimated cost of the main improvement is as follows: —

| | |
|---|---|
| 68,500 cubic yards of material excavated at 30 cents, | $20,550 |
| Supervision and incidental expenses, . . . . | 2,000 |
| Total, . . . . . | $22,550 |

The additional cost of extending it to the upper landing will be as follows: —

| | |
|---|---|
| 18,300 cubic yards of material excavated, at 30 cents, | $5,490 |
| Supervision and incidental expenses, . . . . | 510 |
| Total, . . . . . | $6,000 |

### 2. *Allen's Harbor.*

This harbor, located at Harwichport, is a shallow basin, the survey made by the Board showing that it is now nearly filled with an accumulation of sea-weed and eel-grass. It drains into Nantucket Sound through a narrow channel across a sand beach. This channel in stormy weather is often filled in, and

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breaks out through the beach as the harbor fills up from surface drainage. It is not, so far as could be learned, used by boats, and as the water becomes stagnant during the summer, the decaying vegetable matter gives off unpleasant odors which the residents in the vicinity consider to be unhealthy.

The drainage of the basin by excavating a channel leading into it from the Sound, and the construction of a jetty about 200 feet long at the entrance or the mouth of the channel, so that it might be kept open at all times and allow free flow of the tide in and out of the harbor, would require a channel not less than 50 feet wide on the bottom and excavated to the plane of mean low water. The mouth or outer end of the channel should be protected by a stone jetty and riprap. The channel, about 1,150 feet long, would be located straight across the marsh from the sound to the main portion of the harbor. The channel should be further protected by a light timber fence built from the inner end of the jetty to the bluff on the northerly side of the channel, to catch the drifting sand and build up the beach.

The estimated cost of the whole work is as follows: —

| | |
|---|---|
| Excavation of channel (by local labor), 8,000 cubic yards, at 35 cents, | $2,800 |
| Stone jetty and riprap (local labor), 1,500 cubic yards, at $3, | 4,500 |
| Timber fence (local labor) connecting inner end of jetty with bluff on west side of entrance, | 100 |
| Supervision and incidental expenses, | 700 |
| Total, | $8,100 |

This harbor is situated only a little more than a mile west of Witchmere harbor (where the Commonwealth has expended $19,765.02), and there is very little likelihood of its being used by boats.

### 3. *Quansett Harbor.*

This harbor is a small cove or basin on the northerly shore of Pleasant Bay, which lies between the towns of Orleans and Chatham. A survey has been made by the Board which shows that the basin is oval in shape, about 800 feet long and 400 feet wide. The entrance is about 350 feet wide between the

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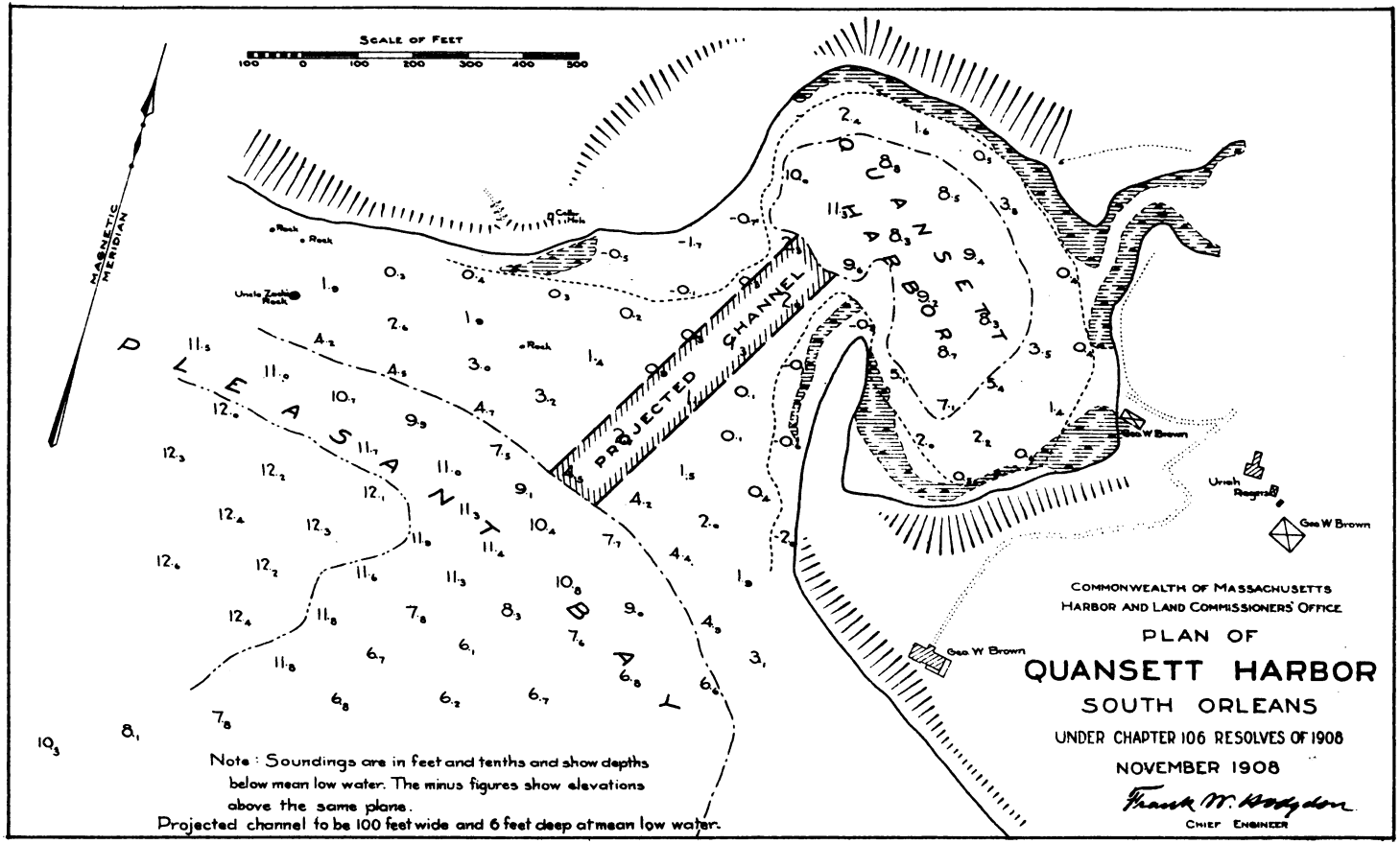


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high-water lines and 130 feet between low-water lines. Within the basin there is a depth of 6 feet at mean low water, covering an area about 500 feet long and 300 feet wide. Over the larger portion of this area there is a depth of from 9 to 11 feet. Pleasant Bay in this vicinity has a depth of over 12 feet at mean low water up to within about 800 feet of the narrowest portion of the entrance to the harbor. The channel leading from Pleasant Bay, through the entrance to the deep water of the basin, is only about 1 foot deep at mean low water, and very narrow.

The improvement desired is a channel through the harbor entrance, connecting deep water of the bay with deep water in the harbor, 100 feet wide on the bottom and 6 feet deep at mean low water, which would require the removal of about 15,000 cubic yards of material, scow measurement.

It does not appear necessary to build jetties or similar structures at the harbor entrance, as, even if these were built, there is not sufficient tidal volume in the harbor to scour out the channel.

An estimate of cost of the above work is as follows: —

| | |
|---|---|
| 15,000 cubic yards of material excavated, at 40 cents, | $6,000 |
| Supervision and incidental expenses, . . . . . | 600 |
| Total, . . . . . | $6,600 |

This harbor is used at the present time wholly by fishermen and others, for small boats. The improvement is desired in order that larger boats may be used, especially for the quahaug fishing, which is carried on in Pleasant Bay. While the survey was being made there were about a dozen boats engaged in this fishing.

### 4. *Plum Island River.*

This river is a narrow channel or strait in Newbury and Newburyport, connecting the head of Plum Island Sound with the Merrimac River near its mouth. It is largely used by pleasure boats and fishermen. At the present time it cannot be used except when the water is above the level of about half tide, the bottom in places being from 1 to 2 feet above mean low water.

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About 2 miles from the deep water of the Merrimac River it is crossed by a drawbridge, which carries the Plum Island turnpike over the river.

The improvement which is desired is to dredge the channel so that it can be navigated at all stages of the tide. The estimates are based upon a channel 50 feet wide on the bottom and 5 feet deep at mean low water. At the northerly end it is probable that such a channel would be liable to be obstructed by sand carried into it by the waves and tidal currents, while the channel south of Woodbridge Island runs through the marshes, where it is much less likely to be filled in.

The distance from Plum Island Sound to the deep water of the Merrimac River is about 5⅛ miles. The length of channel to be dredged is about 3⅞ miles. The amount of excavation required is about 345,000 cubic yards. There are, in addition, a few shoals at the southerly end of the river, but they are not of sufficient extent to seriously obstruct navigation.

The estimate of the cost of the work is as follows: —

| | |
|---|---|
| 345,000 cubic yards of material excavated, at 40 cents, | $138,000 |
| Supervision and incidental expenses, . . . . | 12,000 |
| Total, . . . . . | $150,000 |

### 5. *North River.*

The navigable portion of this river extends from North River bridge at Hanover to the sea, a distance of about 12 miles. For about two-thirds of this distance the channel is more or less obstructed by bowlders, and at one point, locally known as "Hell Gate," near the village of Norwell, by a ledge which extends across the river.

The improvement desired is the removal of these bowlders, a very large portion of which are situated a short distance above the ledge, and clearing a channel about 20 feet wide. The water over the ledge is from 3 to 4 feet deep at local low water, and from 9 to 10 feet at ordinary high water. From a careful examination of the premises, it is estimated that it will require the removal of about 1,285 tons of bowlders to clear the channel, the estimated cost of the same being as follows: —

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| | |
|---|---|
| 1,285 tons of bowlders to be removed, at $6, | $7,710 |
| Supervision and incidental expenses, | 790 |
| Total, | $8,500 |

There is practically no navigation of the river other than by rowboats and power launches used by fishermen and for pleasure purposes, but there is a large number of these.

### 6. *Island End River.*

A survey of this river, which is one of the tributaries of Mystic River, has been made. The United States government has dredged a channel 26 feet deep at mean low water in Mystic River up as far as the mouth of Island End River, and the New England Gas and Coke Company has dredged the channel of Island End River from its mouth up to within about 700 feet of the wharf of the United States naval powder magazine, to a depth of 24 feet at mean low water, and for a further distance up to a point opposite the magazine wharf to a depth of from 8 to 10 feet at mean low water. Above this point the natural channel of the river is very crooked, and has a depth of a little more than 1 foot at mean low water.

The improvement desired, and for which the estimate of cost has been prepared, is for a channel 100 feet wide on the bottom and 10 feet deep at mean low water, extending from the deep water already dredged by the Gas and Coke Company, not following the present channel of the river, but cutting across the marsh for a distance of about 1,000 feet, and extending to the point opposite the westerly boundary line of the New England Structural Company's wharves; it being desired, when the new channel is excavated, to use the excavated material for filling a portion of the present channel which lies south and west of the marsh area and which will be made useless by the cutting of the new channel.

The present channel of the river and the location of the proposed channel across the marsh are both crossed by a gas-pipe line owned and operated by the Boston Consolidated Gas Company to convey gas manufactured in connection with the coke plant of the New England Gas and Coke Company. It crosses

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the present channel of the river on a pile bridge, with a siphon under the navigable channel, over which there is at present a depth of about 8 feet at mean low water. The portion which crosses the location of the proposed channel is in an earthen embankment, and this will have to be changed if the proposed channel is excavated, but no estimates of the cost of this change have been made.

The length of the channel required to be excavated is 3,200 feet, and the estimated amount of excavation, assuming the banks of the channel to slope on an angle of 1 on 3, is 210,000 cubic yards, scow measurement.

The estimated cost of the proposed work is as follows: —

| | |
|---|---|
| Excavation of 210,000 cubic yards, at 25 cents, | $52,000 |
| Supervision and incidental expenses, | 5,200 |
| Total, | $57,200 |

The channel of the river at the present time forms the boundary line between the cities of Chelsea and Everett. If the proposed channel is excavated and a portion of the old channel filled in, a part of this boundary line will be obliterated, and access by the city of Chelsea to some of the marsh land now in that city will be cut off by the new channel.

The Board reports on the improvements desired by local interests for these several harbors and rivers, together with the estimates of cost as above specified, but makes no recommendation as to the advisability of undertaking the same at the expense of the Commonwealth.

| | | |
|---|---|---|
| Appropriation: — | | |
| Chapter 106, Resolves of 1908, | | $2,000 00 |
| Amounts expended in the several surveys: — | | |
| Barnstable harbor, | $217 51 | |
| Allen's harbor, | 219 50 | |
| Quansett harbor, | 194 50 | |
| Plum Island River, | 983 31 | |
| North River, Scituate, | 119 70 | |
| Island End River, | 264 10 | |
| Total, | | $1,998 62 |

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## Town Boundary Survey.

The work of determining the location of the town boundaries has been continued with the same organization as last year, one field party being engaged on a group of towns bounded southerly by Connecticut and westerly by the Connecticut River. The other party was engaged in locating the boundaries of a group of towns in the northerly part of the State on both sides of the Connecticut River, and in extending the main triangulation across a group of 28 towns in the northwesterly corner of the State as a basis for determining the locations of the corners of these towns the coming season.

As the work proceeds towards the western part of the State it is found that a number of town corners are not marked, and the work has been somewhat delayed thereby, as the selectmen are not always very prompt in placing new marks when notified, although apparently ready to do whatever is required.

During the year the location of 78 points, marking angles in town lines, and 191 survey points, mostly on the summits of hills, have been determined by triangulation; and topographic surveys have been made of 29½ miles of the Connecticut and French rivers, forming portions of town boundary lines; and, incidentally thereto, 25½ miles of roads, 8½ miles of small streams and 4 miles of railroad have been mapped.

Topographic surveys have also been made of 4 town boundary lines which are very crooked, and which the town officers desire to have straightened.

The field force has also, as required by statute, marked the position of the new corners in the boundary lines, established by the Legislature upon the recommendation of the Board.

One atlas, describing the boundaries of 1 city and 13 towns, as follows, — Ayer, Billerica, Carlisle, Chelmsford, Dracut, Dunstable, Groton, Littleton, Lowell, Pepperell, Shirley, Tewksbury, Tyngsborough and Westford, — which was printed in the latter part of last year, has been bound and distributed.

A second atlas, describing the boundaries of 1 city and 19 towns, as follows, — Berlin, Bolton, Boxborough, Boylston, Clinton, Harvard, Holden, Hubbardston, Hudson, Lancaster, Marlborough, Northborough, Oakham, Paxton, Princeton, Rut-

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land, Southborough, Sterling, Stow and West Boylston, — has been printed and distributed.

A third atlas, describing the boundaries of 1 city and 21 towns, as follows, — Auburn, Blackstone, Charlton, Douglas, Dudley, Grafton, Hopedale, Hopkinton, Leicester, Mendon, Milford, Millbury, Northbridge, Oxford, Shrewsbury, Spencer, Sutton, Upton, Uxbridge, Webster, Westborough and Worcester, — has been printed and is now in the hands of the binder.

On Dec. 1, 1908, atlases describing the boundaries of 205 cities and towns, out of a total of 354 in the Commonwealth, had been completed and distributed as provided by statute; and another, containing the descriptions of the boundaries of 22 cities and towns, had been printed and was in the hands of the binder; while another, containing the descriptions of 21 cities and towns, is being prepared and will be sent to the printer during the winter.

### Vineyard Haven Harbor.

By chapter 526 of the Acts of 1908, the Board was directed to extend the stone breakwater in Vineyard Haven harbor, and a contract was made June 19, 1908, with Messrs. E. S. Belden & Sons, to extend the breakwater northerly. This work was satisfactorily completed Sept. 21, 1908, 400 lineal feet having been added to the breakwater, at a cost of $9,792.86. The present length of the breakwater is 830 feet.

Appropriations: —

| | |
|---|---|
| Chapter 95, Resolves of 1904, | $500 |
| Chapter 442, Acts of 1905, | 10,000 |
| Chapter 526, Acts of 1908, | 10,000 |
| Total, | $20,500 |

The amount expended this year is $9,999.41.

The total amount expended to Dec. 1, 1908, is $20,218.52.

### West Bay, Osterville.

The work of widening the entrance to the West Bay, at Osterville, under the contract made with John H. Gerrish Sept. 6, 1907, was commenced early in the season, but, owing to various

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causes, it is not yet wholly completed. A small amount of stone work and dredging still remains to be done, but it is expected that it will be fully completed early in the winter.

Up to Dec. 1, 1908, 1,688 tons of stone had been placed in the jetty and as riprap, seventeen-nineteenths of the excavation completed and two-sevenths of the old west timber jetty removed.

For history of work at this place, see last report of this Board (p. 80).

Appropriations: —

| | |
|---|---|
| Chapter 483, Acts of 1897, . . . . . | $8,500 |
| Chapter 440, Acts of 1898, . . . . . | 7,500 |
| Chapter 491, Acts of 1902, . . . . . | 7,500 |
| Chapter 523, Acts of 1907, . . . . . | 10,000 |
| Total, . . . . . | $33,500 |

The amount expended during the year is $5,944.32.

The total amount expended to Dec. 1, 1908, is $35,508.78.

### West Falmouth Harbor.

The work of dredging a channel 50 feet wide and 6 feet deep at mean low water, from the deep water west of Abbotts Point to the town landing, which was in progress at the date of the report for 1907, was completed Jan. 10, 1908, and 14,407 cubic yards of material were excavated.

By chapter 112 of the Resolves of 1908, an appropriation of $10,000 was made for continuing the improvement, and a contract was made Aug. 14, 1908, with John H. Gerrish for excavating a channel 50 feet wide and 6 feet deep at mean low water through the bar at the entrance to the harbor, and for excavating an anchorage basin about 300 feet wide and 350 feet long, with a depth of 6 feet at mean low water, between Abbotts Point and the town landing; also for rounding off the angle in the channel at the point opposite Abbotts Point to a depth of 6 feet at mean low water.

The contract price for this work is 38 cents per cubic yard, measured in scows, and it is expected that work will be commenced during the winter.

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Appropriations: —

| | |
|---|---|
| Chapter 31, Resolves of 1906, | $500 |
| Chapter 512, Acts of 1907, | 5,000 |
| Chapter 112, Resolves of 1908, | 10,000 |
| Total, | $15,500 |

The amount expended during the year is $2,484.22.
The total amount expended to Dec. 1, 1908, is $5,311.62.

### Weymouth Fore River.

By chapter 126 of the Resolves of 1908, the Board was directed to dredge shoals which had formed in the upper part of Weymouth Fore River in the channel excavated by the United States government, in accordance with the provisions of chapter 103 of the Resolves of 1905, whereby the Commonwealth agreed to maintain the channel dredged in said river by the United States government. The appropriation was $2,500.

On Sept. 14, 1908, a contract was entered into with J. P. O'Riorden to dredge, to the depth of 6 feet at mean low water, three areas: the first, opposite Richards coal wharf, 50 feet wide on the bottom and about 250 feet long; the second, 50 feet wide on the bottom and extending from Braintree bridge easterly about 480 feet; and the third, 50 feet wide on the bottom and extending from Braintree bridge southwesterly about 300 feet, the contract price being 40 cents per cubic yard, measured in scows.

This work was completed Oct. 31, 1908, at a total cost of $2,499.49, material to the amount of 5,848 cubic yards having been dredged and deposited at sea. All of the material, with the exception of about 700 cubic yards, was taken from the shoals indicated on the contract plan, this 700 cubic yards being from a shoal about 800 feet lower down the river, and which was a greater obstruction to navigation than the other shoals.

Appropriations for this river are as follows: —

| | |
|---|---|
| Chapter 440, Acts of 1903, | $25,000 |
| Chapter 126, Resolves of 1908, | 2,500 |
| Total, | $27,500 |

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The amount expended during the year is $1,489.97.

The total amount expended in the improvement of this river to Dec. 1, 1908, is $11,725.84.

### Wild Harbor.

By chapter 147 of the Resolves of 1908, an appropriation of $5,000 was made for the construction of a breakwater at Wild Harbor, North Falmouth, in the town of Falmouth, to be built in accordance with plans submitted by the Board in its report for 1907. This report estimated the cost of a breakwater at $25,000, and, after examining the premises, it was decided that so little could be done with the $5,000 appropriated, that it would be inexpedient to begin construction until a larger sum had been appropriated; therefore, no work has been undertaken.

### Winthrop Harbor Channel.

By chapter 107 of the Resolves of 1908, the Board was authorized and directed to dredge an anchorage basin in Winthrop harbor at such point near the club house of the Winthrop Yacht Club as the Board may determine to be most suitable, and authorized to expend therefor not exceeding $5,000.

The area to be dredged was sounded, the location examined, the necessary releases obtained from owners of flats; and on July 31, 1908, a contract was entered into with the Bay State Dredging Company to dredge, to the depth of 6 feet at mean low water, an area lying on the easterly side of the channel between the wharf of the Winthrop Yacht Club and the wharf owned by the United States government, about 380 feet long and about 160 feet wide, the contract price being 24½ cents per cubic yard, measured in scows. The amount of excavation was 20,000 cubic yards.

The amount expended during the year is $3,151.75.

The total amount expended on this project to Dec. 1, 1908, is $9,203.37.

### Witchmere Harbor.

By chapter 119 of the Resolves of 1908, another appropriation was made for Witchmere harbor.

The Board is preparing proposals for furnishing and placing stone for riprapping the banks of the channel, and hopes to get

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bids from local contractors at reasonable prices. The work can be more cheaply done by them in the winter season.

Appropriations: —

| | |
|---|---|
| Chapter 96, Resolves of 1899 (including Witchmere harbor and Lewis Bay), | $1,500 |
| Chapter 91, Resolves of 1904, | 3,500 |
| Chapter 441, Acts of 1906, | 10,000 |
| By the town of Harwich, | 500 |
| Chapter 119, Resolves of 1908, | 3,000 |
| Total, | $18,500 |

No expenditure has been made during the year.

The total amount expended to Dec. 1, 1908, is $19,765.02.

### Wollaston Beach.

The Board was authorized and directed to deepen and enlarge this channel "so that it shall be not less than sixty feet wide on the bottom and six feet deep at mean low water."

A careful survey was made, and it was ascertained that the work would cost at least $18,000, therefore no further action was taken.

Appropriations: —

| | |
|---|---|
| Chapter 366, Acts of 1903, | $7,500 |
| Chapter 108, Resolves of 1908, | 7,500 |
| Total, | $15,000 |

The total amount expended to Dec. 1, 1908, is $7,335.75.

### Wrecks and Obstructions.

Early in April complaint was received that a sunken barge was lying in Saugus River, near the highway bridge nearest the mouth of the river. An examination was made of the premises, and it was decided that the barge did not obstruct navigation to such an extent as to require its removal.

Early in July a lighter owned by the American Agricultural Chemical Company, which had been partially burned at the time of the fire on the Grand Junction wharves, was pulled into the harbor and grounded on the Bird Island flats. The owners then

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decided to abandon her, and removed what machinery remained. As the Board considered that she would become an obstruction to navigation, it notified the owners to remove her, which they did.

Three other inspections were made of obstructions, but no expense was thereby incurred.

Appropriation: —

| | |
|---|---|
| Chapter 69, Acts of 1908, . . . . . | $500 |

No expenditure has been made from this appropriation.

## Sale and Disposition of Massachusetts Atlas Sheets and Town Boundary Atlases.

By chapter 360 of the Acts of 1900, the Topographical Survey Commissioners, whose duties have since been transferred to the Board of Harbor and Land Commissioners, were directed to distribute the atlases showing the boundary lines of the cities and towns of the Commonwealth to the city and town officers and other public depositories, and in addition were authorized to distribute 10 copies as they might deem best.

Upon request of the librarian, a set of the topographical maps was presented to the Massachusetts Agricultural College; also, upon request, a like set was presented to the Massachusetts Historical Society.

The 10 copies for free distribution are exhausted. In order that atlases may be placed where they will be accessible to those who desire the information therein contained, said chapter 360 of the Acts of 1900 should be amended by inserting after the words "United States Geological Survey" the following: "and one copy each to the Boston Athenæum, the Boston Society of Civil Engineers, the Land Court, the United States Coast and Geodetic Survey, the United States Congressional Library, the Massachusetts Highway Commission, the Massachusetts Historical Society, the Massachusetts Agricultural College."

There has been paid into the treasury of the Commonwealth during the year, under authority of chapter 57 of the Resolves of 1890 and chapter 360 of the Acts of 1900, the sum of $197.05, received from the sale of Massachusetts atlas sheets and town boundary atlases.

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## Licenses granted during the Year.

Nos.

3235. Petition of Herbert Austin and Walter Austin, trustees, for license to locate and maintain two floats, and to maintain structures and filling in Marion harbor, in Marion. Granted Dec. 2, 1907.

3236. Petition of the city of Boston for license to dump snow and ice into tide waters. Granted Dec. 18, 1907.

3237. Petition of Charles C. Hanley for license to build a pile wharf and to dredge on Town River, in Quincy. Granted Dec. 18, 1907.

3238. Petition of Howard W. Spurr for license to build and maintain a pile wharf in Edgartown harbor, in Edgartown. Granted Dec. 18, 1907.

3239. Petition of Samuel Cabot, Incorporated, for license to widen a wharf, partly solid and partly on piles, on Chelsea Creek, in Chelsea. Granted Dec. 18, 1907.

3240. Petition of the Nantasket Beach Steamboat Company for license to widen a portion of its Pemberton pier, on piles, in Hull Bay, at Hull. Granted Dec. 18, 1907.

3241. Petition of the city of Salem for approval of plans for the construction of three trunk sewers in Glendale Cove, Salem harbor, in Salem, as authorized by chapter 353, Acts of 1901. Granted Jan. 1, 1908.

3242. Petition of the city of Haverhill for license to construct a submerged sewer outlet in Merrimac River, in Haverhill. Granted Jan. 2, 1908.

3243. Petition of the Lehigh and Wilkes-Barre Coal Company for license to build an addition to its wharf, on piles, on Mystic River, in Boston. Granted Jan. 8, 1908.

3244. Petition of the Soule Mill for license to build bulkheads, excavate and fill solid on Acushnet River, in New Bedford. Granted Jan. 8, 1908.

3245. Petition of the city of Boston for approval of plans for the construction of a bridge over Fort Point Channel, in Boston, as authorized by chapter 466, Acts of 1899. Granted Jan. 13, 1908.

3246. Petition of the city of Boston for license to extend a boundary wall in Boston harbor, at Deer Island. Granted Jan. 17, 1908.

3247. Petition of the Whitman Mills for license to build a bulkhead and fill solid on Acushnet River, in New Bedford. Granted Jan. 17, 1908.

3248. Petition of George C. Elliott for license to build a pile wharf on Merrimac River, in Haverhill. Granted Jan. 17, 1908.

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Nos.

3249. Petition of the Malden Electric Company for license to maintain a foundation, building wall and exhaust steam pipes in Spot Pond Brook, in Malden. Granted Jan. 17, 1908.

3250. Petition of the Malden & Melrose Gas Light Company for license to lay a 24-inch gas pipe under Malden River, in Malden. Granted Jan. 17, 1908.

3251. Petition of the Boston & Maine Railroad for license to fill solid on Annisquam River, in Gloucester. Granted Jan. 17, 1908.

3252. Petition of George R. Blinn and Henry W. Bragg for license to build a bulkhead and pile wharf, fill solid and dredge, on Mystic River, in Boston and Everett. Granted Jan. 20, 1908.

3253. Petition of the Standard Oil Company of New York for license to build bulkheads and pile platforms on Chelsea Creek, at East Boston. Granted Jan. 20, 1908.

3254. Petition of Richard T. Green for license to build a marine railway and pile platform, and to dredge, on Chelsea Creek, in Chelsea. Granted Jan. 20, 1908.

3255. Petition of George A. Beaton for license to build and maintain a pier and jetty in Vineyard Haven harbor, in Tisbury. Granted Jan. 22, 1908.

3256. Petition of the Walworth Manufacturing Company for license to build a sea wall and pile wharf, fill solid and drive fender piles in Boston harbor near the Reserved channel, at South Boston. Granted Jan. 22, 1908.

3257. Petition of the Boston Woven Hose and Rubber Company for license to build a bulkhead and maintain filling on Broad Canal, in Cambridge. Granted Feb. 14, 1908.

3258. Petition of Fallon Brothers for approval of plans for the construction of a pile bridge with a draw therein across Town River, in Quincy, as authorized by chapter 255, Acts of 1906. Granted Feb. 14, 1908.

3259. Petition of the Martha's Vineyard Cold Storage and Ice Company for license to build a wharf in Vineyard Haven Harbor, in Tisbury. Granted Feb. 14, 1908.

3260. Petition of the Old Colony Street Railway Company for license to build a sea wall and pile wharf, fill solid and dredge on Town River and Weymouth Fore River, in Quincy. Granted Feb. 24, 1908.

3261. Petition of the Old Colony Street Railway Company for license to build a bulkhead and fill solid on Town River, in Quincy. Granted Feb. 24, 1908.

3262. Petition of George S. Sinnicks for license to build a sea wall and fill solid in Manchester harbor, in Manchester. Granted Feb. 26, 1908.

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Nos.

3263. Petition of Samuel D. Kelley for license to locate and maintain a float and plank walk on Bass River, in Yarmouth. Granted Feb. 28, 1908.

3264. Petition of the New Bedford, Martha's Vineyard & Nantucket Steamboat Company for license to widen a portion of its wharf, partly solid and partly on piles, in Nantucket harbor, in Nantucket. Granted March 6, 1908.

3265. Petition of the Fall River Gas Works Company for license to lay and maintain a 4-inch gas pipe in Taunton Great River, in Fall River and Somerset. Granted March 13, 1908.

3266. Petition of Thomas S. Hathaway for license to build and maintain a stone breakwater in Buzzards Bay at Dartmouth. Granted March 20, 1908.

3267. Petition of the Harlow Brook Cranberry Company for license to build a flume, excavate a canal and draw water from Charge Pond, in Plymouth. Granted April 1, 1908.

3268. Petition of the West Shore Association for license to build and maintain a pile wharf opposite the club house of the Kalumet Canoe Club in Lake Quinsigamond, in Worcester. Granted April 8, 1908.

3269. Petition of the West Shore Association for license to build and maintain a pile wharf in South Bay in Lake Quinsigamond, in Worcester. Granted April 8, 1908.

3270. Petition of George C. Thomas for license to build a wharf and locate and maintain a float in Marion harbor, at East Marion. Granted April 8, 1908.

3271. Petition of the city of Taunton for license to locate and maintain a floating bath-house on Taunton River, in Taunton. Granted April 8, 1908.

3272. Petition of Harvey T. Wing for license to build a boat house and pier, on piles, on Broad Sound, in Revere. Granted April 8, 1908.

3273. Petition of the American Printing Company for license to build and maintain two coal-hoisting towers in the dock adjoining its wharf in Fall River. Granted April 8, 1908.

3274. Petition of the town of Hull for license to rebuild and widen so much of the bridge over the inlet to Strait's Pond as lies within said town. Granted April 15, 1908.

3275. Petition of the town of Hingham for license to rebuild and widen so much of the bridge over the inlet to Strait's pond as lies within said town. Granted April 15, 1908.

3276. Petition of the town of Cohasset for license to rebuild and widen so much of the bridge over the inlet to Strait's Pond as lies within said town. Granted April 15, 1908.

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Nos.

3277. Petition of Charles B. Robbins for license to locate and maintain three float stages on Acushnet River, in New Bedford. Granted April 15, 1908.

3278. Petition of David G. Pratt for license to build and maintain a pile pier and float in Buzzards Bay, at Wareham. Granted April 24, 1908.

3279. Petition of the town of Groveland and the Haverhill Electric Company for license to lay and maintain a cable in and across Merrimac River, in Haverhill. Granted April 24, 1908.

3280. Petition of the New England Pottery Company for license to build a pile wharf and to maintain filling in Chelsea Creek, at East Boston. Granted May 1, 1908.

3281. Petition of the city of Boston for approval of plans for the construction of sea walls and bulkhead on the line of Northern Avenue across the head of docks Nos. 2 and 3 and pier 3 (proposed), on the property of the New York, New Haven and Hartford Railroad Company, at South Boston, as authorized by chapter 381, Acts of 1903. Granted May 1, 1908.

3282. Petition of the city of Boston for license to extend its wharf, on piles, in Boston harbor, at Long Island. Granted May 1, 1908.

3283. Petition of Edward J. Ball for license to build a bulkhead and fill solid in Hull Bay, near Allerton station, in Hull. Granted May 4, 1908.

3284. Petition of the Valvoline Oil Company for license to build a bulkhead, pile wharf and two dolphins, and to fill solid on Chelsea Creek, in Chelsea. Granted May 4, 1908.

3285. Petition of the city of Lynn for license to fill solid in Raddin's Dock on Saugus River, in Lynn. Granted May 11, 1908.

3286. Petition of the New York, New Haven & Hartford Railroad Company for license to build and maintain draw piers, on piles, a pile dolphin and pile and timber fenders at its bridge on Neponset River, in Boston and Quincy. Granted May 11, 1908.

3287. Petition of Walter G. King and Kate King for license to build a bulkhead and fill solid in Lynn harbor, in Lynn. Granted May 18, 1908.

3288. Petition of William Barry Owen for license to build and maintain a pile pier in Vineyard Haven harbor, at Tisbury. Granted May 22, 1908.

3289. Petition of the Edison Electric Illuminating Company of Boston for approval of plans for laying two cables in Fort Point Channel at Northern Avenue bridge, in Boston, under authority of chapter 249, Acts of 1898. Granted May 25, 1908.

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Nos.

3290. Petition of the city of Boston for license to rebuild a portion of Chelsea Street bridge, on piles, and to relocate and rebuild the draw pier therein, on Chelsea Creek, in Boston and Chelsea. Granted May 25, 1908.

3291. Petition of the Boston & Albany Railroad, the New York Central & Hudson River Railroad Company, lessee, for license to rebuild a portion of its bridge, on piles, on Chelsea Creek, in Boston and Chelsea. Granted May 25, 1908.

3292. Petition of Webster L. Draper for license to lay and maintain a 4-inch iron drain pipe in Vineyard Sound, in Falmouth. Granted May 25, 1908.

3293. Petition of Edward W. Bartlett for license to build a sea wall and fill solid in Hingham harbor, in Hingham. Granted June 1, 1908.

3294. Petition of Samuel Cabot, Incorporated, for license to build a bulkhead and pile platform and fill solid on Chelsea Creek, in Chelsea. Granted June 1, 1908.

3295. Petition of the city of Boston for license to lay and maintain a 4-inch water pipe in Boston harbor from Long Island to Rainsford Island, in Boston. Granted June 12, 1908.

3296. Petition of the city of Boston for license to lay and maintain a 12-inch water pipe in Boston harbor from Long Island to Moon Island. Granted June 12, 1908.

3297. Petition of the N. Ward Company for license to lay and maintain a 4-inch water pipe from Long Island to Spectacle Island, and a telephone cable from Spectacle Island to Moon Head, in Boston harbor. Granted June 12, 1908.

3298. Petition of Catharine L. Marion for license to build and maintain a pile wharf and float on Mitchell's River, in Chatham. Granted June 26, 1908.

3299. Petition of the city of Cambridge for license to fill solid on Charles River from a point near River Street bridge southerly towards Pleasant Street, in Cambridge. Granted June 29, 1908.

3300. Petition of the city of Cambridge for license to build a sea wall and fill solid on Charles River at the northerly end of Western Avenue bridge, in Cambridge. Granted June 29, 1908.

3301. Petition of John N. Chamberlain for license to build an addition to his wharf in Lake Anthony, at Oak Bluffs. Granted July 2, 1908.

3302. Petition of the town of Braintree for license to construct and maintain a pile dolphin on Monatiquot River, in Braintree. Granted July 6, 1908.

3303. Petition of the Westport Manufacturing Company for license to widen the existing roadway in and over Westport Mill Pond, in Dartmouth. Granted July 6, 1908.

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Nos.

3304. Petition of the city of Boston for license to reconstruct a portion of the wharf on the northwest side of Long Island in Boston harbor, in Boston. Granted July 13, 1908.

3305. Petition of the city of New Bedford for license to build a masonry bulkhead and extend the sewer in Washburn Street into Acushnet River, in New Bedford. Granted July 13, 1908.

3306. Petition of John Duff for license to build a pile wharf on Acushnet River at Fish Island, in New Bedford. Granted July 13, 1908.

3307. Petition of Edgar N. Baker and Edwin M. White for license to build a bulkhead and fill solid on Bass River, in Yarmouth. Granted July 13, 1908.

3308. Petition of George W. Giddings for license to build and maintain a pile wharf and lay and maintain a drain pipe in Vineyard Sound at Falmouth Heights, in Falmouth. Granted July 13, 1908.

3309. Petition of Alvaro V. Dubois for license to build and maintain a pile platform and steps in Mount Hope Bay at Sandy Beach, in Fall River. Granted July 13, 1908.

3310. Petition of Frederick P. Forster, Richard M. Winfield and Frederick W. Dickinson for license to build and maintain a pile wharf in West Bay at Osterville, in Barnstable. Granted July 13, 1908.

3311. Petition of Joseph W. Stickney for license to build a bulkhead and fill solid on Chelsea Creek, in Chelsea. Granted July 20, 1908.

3312. Petition of the Magnolia Wharf Corporation for approval of plans for the construction of a pile wharf and landing stage in Easterly Kettle Cove at Magnolia, in Gloucester, as authorized by chapter 576, Acts of 1908. Granted July 20, 1908.

3313. Petition of the Boston Consolidated Gas Company for approval of plans for the driving of piles and building a trestle for the support of a 20-inch gas pipe, and the construction of a siphon at the draw way at Chelsea Street bridge on Chelsea Creek, in Boston and Chelsea, under authority of chapter 537, Acts of 1896. Granted July 20, 1908.

3314. Petition of St. Alphonsus Athletic Association for license to build and maintain pile structures in Charles River at Brookline Street bridge, in Boston. Granted July 27, 1908.

3315. Petition of Harry G. Taft for license to fill solid in Great Herring Pond in Plymouth. Granted July 27, 1908.

3316. Petition of the Connecticut Valley Lumber Company for license to hang and maintain booms in and across Connecticut River, in Gill and Montague. Granted June 10, 1908.

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Nos.

3317. Petition of the Connecticut Valley Lumber Company for license to hang and maintain booms in and across Connecticut River, in Northampton and Hadley. Granted July 31, 1908.

3318. Petition of the Gloucester Salt Fish Company for license to extend its wharf, on piles, in Gloucester harbor at Rocky Neck, in Gloucester. Granted Sept. 16, 1908.

3319. Petition of the town of Revere, by its park commissioners, for license to build a dike and fill solid in Belle Isle Inlet and exclude tide-water from the area between Atlantic Avenue and Orchard Street, in Revere. Granted Sept. 16, 1908.

3320. Petition of the Fore River Shipbuilding Company to extend its marine railway on Weymouth Fore River, in Quincy. Granted Sept. 16, 1908.

3321. Petition of William C. Atwater & Co. to build a pile structure in and over a dock on Taunton River, in Fall River. Granted Sept. 16, 1908.

3322. Petition of Storer Francis Crafts to build and maintain a stone pier and a float on Annisquam River, in Gloucester. Granted Sept. 28, 1908.

3323. Petition of Lena Rosenbloom to build a sea wall and fill solid on South River, in Salem. Granted Sept. 28, 1908.

3324. Petition of the Standard Oil Company of New York for license to build a sea wall, dredge and fill solid on Chelsea Creek, at East Boston. Granted Oct. 2, 1908.

3325. Petition of the Boston & Albany Railroad, the New York Central & Hudson River Railroad Company, Lessee, for license to reconstruct the Cunard pier, on piles, in Boston harbor, at East Boston. Granted Oct. 12, 1908.

3326. Petition of George F. Proctor for license to build a bulkhead and pile wharf, to fill solid and dredge on Chelsea Creek, in Revere. Granted Oct. 16, 1908.

3327. Petition of the Quincy Yacht Club for license to rebuild its club house, on piles, and to locate and maintain floats on Weymouth Fore River at Hough's Neck, in Quincy. Granted Oct. 21, 1908.

3328. Petition of Adelia E. Tyler and George C. Jewell for license to extend their wharf by building a sea wall and filling solid on Merrimac River, in Haverhill. Granted Oct. 26, 1908.

3329. Petition of the Standard Oil Company of New York for license to build a sea wall and fill solid on Chelsea Creek, at East Boston. Granted Nov. 2, 1908.

3330. Petition of John N. Chamberlain for license to build an addition to his wharf, on piles, in Lake Anthony, at Oak Bluffs. Granted Nov. 2, 1908.

3331. Petition of Herbert E. Small for license to build and maintain a pile structure in Provincetown harbor, in Provincetown. Granted Nov. 2, 1908.

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Nos.

3332. Petition of the Boston Elevated Railway Company for license to dump snow and ice into tide waters. Granted Nov. 6, 1908.

3333. Petition of the city of Boston for license to dump snow and ice into tide waters. Granted Nov. 6, 1908.

3334. Petition of Marie L. E. Gaff and Mary G. Hinkle for license to build structures, dredge and fill solid in Centreville River at Osterville, in Barnstable. Granted Nov. 25, 1908.

3335. Petition of Elnathan E. Eldredge for license to lay a flume in Cedar Pond, in Orleans. Granted Nov. 30, 1908.

MISCELLANEOUS PERMITS GRANTED DURING THE YEAR.

TOWN OF MANCHESTER, to dredge in Manchester harbor. Granted Dec. 2, 1907.

ELLEN M. BOARDMAN, to take and remove gravel from Salter's Beach, in Plymouth. Granted Jan. 20, 1908.

MILTON DA COSTA, to use and occupy Quarantine Rock, in Boston harbor. Granted March 6, 1908.

BETTS BROTHERS & Co., to dredge material from Shirley Gut. Granted March 6, 1908.

EASTERN DREDGING COMPANY, to dredge material from Shirley Gut. Granted March 18, 1908.

W. H. ELLIS, to dredge material from Charles River basin for use in constructing the Boston marginal conduit and the Boston embankment. Granted March 27, 1908.

EDISON ELECTRIC ILLUMINATING COMPANY of Boston, to dredge in Boston harbor near the Reserved Channel, at South Boston. Granted March 30, 1908.

THE NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY, to erect a pole on the Commonwealth's land, at South Boston. Granted April 1, 1908.

SELECTMEN OF THE TOWN OF MARION, to remove an obstruction in Marion harbor, known as Gull Rock. Granted April 8, 1908.

BAY STATE DREDGING COMPANY, to dredge material in Boston harbor, at Point Shirley. Granted April 15, 1908.

HERBERT L. ANDREWS and E. U. IWWERKS, to use and occupy a part of Berry Island in Lake Winthrop, in Holliston. Granted April 17, 1908.

SELECTMEN OF THE TOWN OF HULL, to take material from the beach easterly of Beach Avenue, for use on said avenue. Granted April 27, 1908.

BAY STATE DREDGING COMPANY, to dredge material from Charles River, above the North Beacon Street bridge. Granted May 1, 1908.

JOHN T. SHEA, Jr., to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted May 6, 1908.

MARY R. LINCOLN and MARY LINCOLN, to remove gravel from the beach off Otis Street, in Hingham. Granted May 8, 1908.

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Filippa M. Zottoli, to remove rocks from the beach at her premises in Revere. Granted May 8, 1908.

P. Maloy & Son, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted May 13, 1908.

Alfred Sorensen, to use for storage purposes a portion of the Commonwealth pier, at South Boston. Granted May 20, 1908.

Boston Molasses Company, to dredge a berth at the wharf belonging to the Commonwealth and leased to said company, on the Commonwealth flats, at South Boston. Granted May 22, 1908.

The Fore River Shipbuilding Company, to dredge in Weymouth Fore River, to the depth of 19 feet below mean low water, for the launching of the battleship "North Dakota." Granted June 3, 1908.

Joshua Crane, to dredge in Red Brook harbor, at Cataumet. Granted June 10, 1908.

The R. S. Brine Transportation Company, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted June 15, 1908.

Trustees of the Main Street Land Trust, to dredge material from their flats in Charles River, on the Cambridge side of the channel, near Cambridge bridge. Granted June 19, 1908.

Jeremiah P. O'Riorden, to dredge sand in Ipswich and Merrimac rivers. Granted July 8, 1908.

Hamilton W. Welch, to remove stones from Mann Hill Beach, at Egypt, in the town of Scituate. Granted July 13, 1908.

Magnolia Wharf Corporation, rules and regulations for the use of wharf in Easterly Kettle Cove, in Gloucester. Approved July 20, 1908.

Lake Grove Cemetery Association, to use and occupy Grape Island in Lake Winthrop, in Holliston. Granted July 31, 1908.

Betts Brothers & Co., to use for storage purposes an area of the Commonwealth flats, at South Boston. Granted Aug. 3, 1908.

Alfred Sorensen, renewal of permit granted May 20, 1908, to use for storage purposes a portion of the Commonwealth pier, at South Boston. Granted Aug. 20, 1908.

Rowe Brothers Company, to dredge sand in Ipswich River. Granted Sept. 11, 1908.

Boston Beer Company, to dump ashes on the Commonwealth flats, at South Boston. Granted Sept. 14, 1908.

John H. Gerrish, to use an area easterly of the Commonwealth pier, within the United States pier and bulkhead line, at South Boston, to store gravel dredged from Broad Sound. Granted Sept. 23, 1908.

Eastern Dredging Company, to dredge material within the limits of the 27-foot government channel in "The Narrows." Granted Sept. 28, 1908.

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JOHN KINGSBURY, to use and occupy Rat Island in Lake Winthrop, in Holliston. Granted Oct. 14, 1908.

BAY STATE DREDGING COMPANY, to dump gravel on the easterly side of the Commonwealth pier, at South Boston. Granted Oct. 21, 1908.

FRED D. GRAVES, to remove sand from the beach at North Scituate. Granted Oct. 28, 1908.

SPRAGUE, BREED & BROWN COMPANY, to remove ledge in Beverly harbor near its wharf, in Beverly. Granted Nov. 2, 1908.

BOSTON ELEVATED RAILWAY COMPANY, to dump snow and ice on the Commonwealth flats, at South Boston. Granted Nov. 6, 1908.

CURTIS H. BURT, to remove stones from the beach at Point Allerton, in Hull. Granted Nov. 9, 1908.

THOMAS BUTLER & Co., to break up, burn and remove the hull of the vessel "St. Mary's," from tide water at Point of Pines, in Revere. Granted Nov. 23, 1908.

JOHN DUFF, to dredge a berth in Acushnet River, in New Bedford. Granted Nov. 25, 1908.

DENNISON BROTHERS COMPANY, to dredge a berth in Acushnet River, in New Bedford. Granted Nov. 25, 1908.

## WORK OF THE UNITED STATES IN RIVERS AND HARBORS OF THE COMMONWEALTH.

The Board is indebted to Lieut.-Col. Edward Burr, Corps of Engineers, U. S. A., who is in charge of river and harbor improvements in eastern Massachusetts, and Lieut.-Col. J. C. Sanford, Corps of Engineers, U. S. A., who is in charge of similar work in southern Massachusetts, for the following statements, which show the work accomplished in the rivers and harbors of the Commonwealth during the fiscal year ending June 30, 1908: —

STATEMENT OF LIEUT.-COL. EDWARD BURR, CORPS OF ENGINEERS, U. S. A.

BOSTON, MASS., Nov. 27, 1908.

*Board of Harbor and Land Commissioners, Commonwealth of Massachusetts, State House, Boston, Mass.*

SIRS: — In accordance with your request of the 16th inst., I have the honor to furnish the following summary of work accomplished by the United States during the fiscal year ending June 30, 1908, upon the improvement of rivers and harbors in Massachusetts under the charge of this office.

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*Newburyport Harbor.*

Fourteen thousand, one hundred and thirty-eight tons of stone were deposited in the north jetty, with which about 400 feet of the jetty were retopped, and the jetty was extended seaward about 163 feet.

*Merrimac River.*

Four thousand, one hundred and two cubic yards were dredged between the highway bridge and the railroad bridge at Haverhill in completing, with the depth of 7 feet at mean low water, the channel 150 feet wide from Newburyport to Haverhill.

*Harbor of Refuge, Sandy Bay, Cape Ann.*

In the substructure of the western arm of the breakwater 136,205 tons of rubblestone were deposited.

On the southern arm construction of superstructure was commenced at a point 200 feet south of the angle, and 119 linear feet of the first course and 71 linear feet of the second course in the seaward wall, and 33 linear feet of the first course in the harbor wall, were laid.

*Beverly Harbor.*

Forty-one thousand, three hundred and seventy-eight cubic yards of material were dredged, completing all dredging to obtain a channel 18 feet deep and of width varying from 250 feet to 200 feet up to the railroad bridge. This channel is, however, obstructed by ledges yet to be removed, and which restrict the available width.

*Lynn Harbor.*

Under a continuing contract made in 1905, 22,184 cubic yards were dredged, completing the projected channel, 200 feet wide and 15 feet deep at mean low water.

*Malden River.*

In May and June, 1908, 15,494 cubic yards were dredged from that section of the channel extending about 3,600 feet downstream from Medford Street bridge.

*Mystic River below Mouth of Island End River.*

Eighteen thousand, two hundred and fifteen cubic yards of material were dredged in removing shoals in the section of dredged channel between Chelsea bridge and the mouth of Island End River; and 38,732 cubic yards of material were dredged from the section of channel below Chelsea bridge.

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*Boston Harbor.*

*Thirty-five-foot Channel.* — Under this project 1,184,118 cubic yards of material were dredged from the channel between President Roads and the Navy Yard, Chelsea and Charles River bridges; and 662,669 cubic yards from the channel extending in Broad Sound from President Roads to the sea.

Drilling and blasting of rock in the inner main ship channel was in progress throughout the year.

*Fort Point Channel.*

By dredging 5,887 cubic yards of material, the authorized channel, 23 feet deep at mean low water and 175 feet wide, from the entrance to Federal Street (Dorchester Avenue) bridge, was completed.

*Dorchester Bay and Neponset River.*

A contract has been made for all the dredging necessary to complete the improvement authorized by Congress, but work thereunder has not been commenced.

*Weymouth Back River.*

In completion of the authorized channel, 12 feet deep at mean low water and 200 feet wide, 22,235 cubic yards of material were dredged.

*Provincetown Harbor.*

In the vicinity of Abel Hill dike, 1,418 feet of timber bulkheads were built and minor repairs were made to the bulkheads in that vicinity and at Wood End.

*Removal of Wrecks.*

The wreck of the schooner "Phineas H. Gay," at the entrance to Broad Sound, Boston harbor, was reduced to a least depth of 40 feet at mean low water; the wreck of the schooner "Julia A. Decker," in Newburyport harbor, was totally removed; the wreck of the schooner "Helen F. Ward," in Provincetown harbor, was totally removed; and the removal of the wreck of the steamer "City of Birmingham," in the 35-foot channel, Boston harbor, has been in progress.

Very respectfully,

EDWARD BURR,
*Lieutenant-Colonel, Corps of Engineers.*

Statement of Lieut.-Col. J. C. Sanford, Corps of Engineers, U. S. A., showing the work done by the United States on the rivers and harbors of Massachusetts under the Newport, R. I., engineer office, during the fiscal year ending June 30, 1908: —

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*Nantucket Harbor.*

Work under contract with E. S. Belden & Sons, dated May 13, 1907, for extending the jetties with the top raised to half-tide level, and for building up to full height that portion of the east jetty crossing Coatue flats, which was in progress at the close of the last fiscal year, was continued until Sept. 5, 1907, when the contract was completed. There was placed in the extension of the east jetty a total of 11,808.5 tons of stone, and 7,807 tons were used in raising the incomplete portions of the jetty across Coatue flats. This work extended the jetty 768 feet of half-tide level, with a mound on the end for the support of a lantern staff. The end of the east jetty now reaches the 12-foot contour in Nantucket Sound. It also built up about 1,300 feet of the jetty to the height of 5 feet above mean low water; but this part of the jetty was not made of full cross-section, and is liable to some deterioration from the action of the sea and ice, it being considered of greater importance to increase the length of the portions above water than to build out a shorter distance with the full dimensions.

*Vineyard Haven.*

No works of improvement were in progress during the fiscal year.

*Woods Hole Channel.*

Under date of Dec. 16, 1907, a contract was entered into with Charles M. Cole of Fall River, Mass., for the removal of certain shoals remaining in the Woods Hole Strait, and dredging off that portion of Mink Point, the northeastern extremity of Nonamesset Island, which formed a partial barrier to the southerly entrance to the channel. Work under this contract was commenced Dec. 26, 1907, and was completed June 10, 1908. This made a channel 300 feet wide and 13 feet deep at mean low water, excepting one slightly shoal spot at the eastern end of the main channel, which will have to be removed by dynamite, as the dredge was unable to remove it.

*New Bedford and Fairhaven Harbor.*

Under date of July 20, 1907, a continuing contract was entered into with the Coastwise Dredging Company of Norfolk, Va., for dredging a channel from Buzzards Bay to Palmers Island, an anchorage area between New Bedford and Fairhaven, and a channel through the drawbridge with a turning basin above it, all of 25 feet depth at mean low water, and of such widths as the funds authorized ($300,000) would permit. Up to the close of the fiscal year, 1,195,913 cubic yards of mud, sand and gravel, together with 3.667 cubic yards of bowlders exceeding 1 cubic yard, were removed.

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*Removal of Wrecks.*

The following wrecks were removed so as no longer to form obstructions to navigation: —

Schooner "James S. Steele" (Gloucester fisherman), sunk in Vineyard Sound, Mass., on northerly edge of Middle Ground Shoal, ¾ miles east of south from the black can buoy No. 35½.

Schooner "Demozelle," British schooner, sunk in 13 fathoms of water in western entrance to Vineyard Sound, Mass., Oct. 13, 1907. Masts removed.

Schooner "Rebecca Shepard," lost on Pollock Rip Shoal, Mass., Dec. 4, 1907, in 4 fathoms of water.

Schooner "Jesse Barlow," lost Dec. 18, 1907, in 25 feet of water, 200 feet southwest of Pollock Rip Slue Lightship.

Schooner "Alice T. Boardman." The wreck of this vessel was drifting about Hyannis harbor, Mass. It had been cut in two amidships.

## Appropriation for Survey and Improvement of Harbors.

By chapter 69 of the Acts of 1908, an appropriation of $4,000 was made for surveys of harbors and for improving and preserving the same, and for repairing damages occasioned by storms along the coast line or river banks of the Commonwealth.

Expenditures from this appropriation have been made to Dec. 1, 1908, in the localities and to the amounts following, viz.: —

| | |
|---|---|
| Manchester harbor, | $18 75 |
| Stage Harbor, Chatham, | 1,087 41 |
| West Bay, Osterville, | 8 94 |
| West Falmouth, | 111 14 |
| Weymouth Fore River, | 1,329 68 |
| Winthrop harbor channel, | 106 33 |
| Wollaston Beach, Quincy, | 6 00 |
| Total, | $2,668 25 |

## Commonwealth's Flats Improvement Fund.

The balance in the Commonwealth's flats improvement fund on the first day of December, 1907, was $1,159,273.49. To this has been added during the year $41,884.68 from the income of the fund and $30,143.48 from sales, rents of lands and other sources, making a total of $1,231,301.95. Of this sum there

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has been expended during the year $160,855.21, leaving a balance on Nov. 30, 1908, of $1,070,446.44, subject to reduction for existing liabilities by reason of the anchorage basin contracts under chapter 476 of the Acts of 1901.

### Harbor Compensation Fund.

There was paid into the treasury of the Commonwealth during the year, under chapter 146 of the Acts of 1897 and chapter 96 of the Revised Laws, for tide water displaced by work done under licenses granted by the Board, and for rights and privileges granted in tide waters and great ponds, the sum of $9,235.67, which was credited to the harbor compensation fund for Boston harbor. The amount in this fund on Nov. 30, 1908, was $590,959.22; the balance of income from this fund in the treasury on the same date was $3,280.26; the total income for the year was $24,135.74. The expenditure for dredging during the year, from the income, was $48,251.73.

The foregoing report is respectfully submitted.

GEORGE E. SMITH,
SAMUEL M. MANSFIELD,
HEMAN A. HARDING,
*Commissioners.*

Dec. 1, 1908.

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# APPENDIX.

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# Appendix A.

## Appropriations by the Legislature and Expenditures for River and Harbor Work under Direction of the Harbor and Land Commissioners.

*Small Harbors. — From 1896 to 1908 inclusive.*

| LOCALITY. | Character of Work. | Total Appropriation. | Total Expenditure. | Approximate Balance required to complete Contract. |
|---|---|---|---|---|
| Allen's harbor, | Survey, | $219 50 | $219 50 | - |
| Annisquam River, | Dredging, | 56,881 15 | 56,848 44[1] | - |
| Apponagansett harbor, | Stone breakwater, | 40,500 00 | 40,221 33 | - |
| Barnstable harbor, | Survey, | 217 51 | 217 51 | - |
| Bass River, Beverly, | Dredging, | 25,000 00 | 25,539 81[1] | - |
| Bass River, Yarmouth, | Jetties and dredging, | 37,500 00 | 37,315 43[1] | - |
| Cataumet harbor, | Survey, | 500 00 | 356 33 | - |
| Cotuit harbor, | Improving entrance, | 10,000 00 | 2,160 67[1] | - |
| Cuttyhunk harbor, | Jetties and dredging, | 21,000 00 | 14,694 43[1] | $500 00 |
| Deacons Pond, Falmouth, | Jetties and dredging, | 25,000 00[2] | 21,463 49[1] | 13,000 00 |
| Dorchester, easterly shore, | Dredging, | 70,000 00 | 48,347 66[1] | 15,000 00 |
| East Bay, Osterville, | Jetties and dredging, | 16,938 39 | 11,550 38[1] | 3,900 00 |
| Essex River, | Dredging, | 5,000 00 | 5,000 00 | - |
| Green harbor, | Jetties and dredging, | 92,000 00 | 76,333 26[1] | - |
| Herring River, Harwich, | Jetties and dredging, | 10,500 00[3] | 12,448 97[1] | - |
| Herring River, Wellfleet, | Dike and ditches, | 10,000 00[4] | 7,604 08[1] | 11,500 00 |
| Hingham harbor, | Dredging, | 5,000 00 | 13 74 | - |
| Ipswich River, | Dredging, | 11,000 00 | 11,188 56[1] | - |
| Island End River, | Survey, | 264 10 | 264 10 | - |
| Lake Anthony, Oak Bluffs, | Jetties and dredging, | 35,000 00 | 36,184 84[1] | - |
| Lewis Bay, Hyannis, | Dredging, | 16,477 21 | 17,012 22[1] | - |
| Lynn harbor, | Dredging, | 10,000 00 | - | - |
| Manchester harbor, | Dredging, | 8,000 00 | 8,128 58[1] | - |
| Menamsha Inlet, | Jetties and dredging, | 44,000 00 | 45,673 30[1] | - |
| Merrimac River, | Investigation, | 100 00 | - | - |
| Nantucket harbor, | Dredging, | 15,000 00 | 15,930 30[1] | - |

[1] A portion paid from general appropriation.
[2] $10,000 additional by town of Falmouth.
[3] $2,000 additional by town of Harwich.
[4] $10,000 additional by town of Wellfleet.

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*Small Harbors, etc.* — Continued.

| LOCALITY. | Character of Work. | Total Appropriation. | Total Expenditure. | Approximate Balance required to complete Contract. |
|---|---|---|---|---|
| Neponset River, | Dredging, | $34,270 44 | - | - |
| North River, Scituate, | Survey, | 119 70 | $552 77[1] | - |
| Oak Bluffs, public landing, | Removing rocks, | 500 00 | 462 50 | - |
| Orient Heights, | Dredging, | 1,500 00 | - | - |
| Paskamansett River, | Dredging, | 2,000 00 | 2,092 15[1] | - |
| Penikese Island, | Pile wharf, | 5,000 00 | 128 38 | $4,800 00 |
| Plum Island River, | Survey, | 983 31 | 983 31 | - |
| Plymouth harbor, | Dredging, | 80,400 00[2] | 1,351 24[1] | 122,000 00 |
| Province Lands, | Reclamation, | 58,000 00 | 48,083 24 | - |
| Quansett harbor, | Survey, | 195 88 | 194 50 | - |
| Quicks Hole, | Survey, | 500 00 | - | - |
| Red River, Chatham, | Jetty, | 1,000 00 | 1,111 35[1] | - |
| Revere, | Stone breakwater, | 55,000 00 | 44,571 69 | 10,400 00 |
| Rock harbor, Orleans, | Dredging, | 5,200 00 | 621 06 | 4,575 00 |
| Rockport harbor, | Removing rocks, | 8,000 00 | 2,810 84 | 4,500 00 |
| Saugus River, | Survey, | 1,000 00 | 638 53 | - |
| Scituate, | Sea walls and riprap, | 36,800 00 | 35,749 26[1] | - |
| Scorton harbor, | Jetty and dredging, | 15,000 00 | 12,916 65[1] | - |
| Sesuit harbor, | Jetty, | 10,200 00 | 201 50 | 8,200 00 |
| Shirley Gut, | Dredging, | - | 1,906 20[3] | - |
| South River, Salem, | Dredging, | 5,000 00[4] | 158 66[3] | - |
| Southerly shore of South Boston. | Dredging, | 100,000 00 | 100,239 96[1] | - |
| Stage harbor, Chatham, | Dikes, | 6,000 00 | 9,231 93[1] | - |
| Stony Beach, Hull, | Sea wall, | 11,500 00 | 11,227 17 | - |
| Taunton River, Boston harbor canal. | Survey, | 10,000 00 | 9,932 75 | - |
| Vineyard Haven harbor, | Stone breakwater, | 20,500 00 | 20,218 52[1] | - |
| Waquoit Bay, | Survey, | 1,000 00 | 701 61 | - |
| West Bay, Osterville, | Jetties and dredging, | 33,500 00 | 35,508 78[1] | 2,800 00 |
| West Falmouth harbor, | Dredging, | 15,500 00 | 5,311 62[1] | 9,200 00 |
| Weymouth Fore River, | Dredging, | 27,500 00 | 11,725 84[1] | - |
| Wild harbor, | Breakwater, | 5,150 00 | 93 13 | - |
| Winthrop harbor channel, | Dredging, | 5,000 00 | 9,203 37[1] | 2,000 00 |
| Winthrop harbor, Cottage Park. | Dredging, | 6,525 00 | 6,581 66[1] | - |

[1] A portion paid from general appropriation.
[2] One-half cost by town of Plymouth.
[3] Paid from general appropriation.
[4] $3,000 additional by individuals.

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*Small Harbors, etc.* — Concluded.

| LOCALITY. | Character of Work. | Total Appropriation. | Total Expenditure. | Approximate Balance required to complete Contract. |
|---|---|---|---|---|
| Witchmere harbor, . . | Jetties and dredging, | $18,000 00[1] | $19,765 02[2] | - |
| Wollaston Beach, Quincy, | Dredging, . . . | 15,000 00 | 7,335 75[2] | - |
| Wrecks, . . . . | Removal from tide water. | 40,916 66 | 4,406 53 | - |
| Total, . . . . | . . . . . | $1,202,858 84 | $900,734 40 | $212,375 00 |

*Boston Main Harbor. — From 1870 to 1908 inclusive.*

| | | | | |
|---|---|---|---|---|
| Anchorage basin, . . | Dredging, . . . | $1,002,500 00 | $454,596 30 | $60,000 00 |
| Boston harbor, . . . | Dredging, . . . | 165,000 00[3] | 505,875 41 | 4,350 00 |
| Commonwealth's flats at East Boston. | Harbor improvement, | 100,000 00 | 32,581 27[2] | - |
| Commonwealth's flats at South Boston. | Harbor improvement, | 3,838,902 03 | 3,088,154 19 | - |
| Commonwealth pier, . . | Wharf and slip, . . | 400,000 00 | 381,877 09 | - |
| Dry dock, . . . . | Investigation, . . | 5,000 00 | 435 50 | - |
| Metropolitan dock system, | Investigation, . . | 1,000 00 | 644 15 | - |
| Northern Avenue, . . | Bridge, . . . | 260,000 00 | 260,000 00 | - |
| South Bay improvement fund. | Dredging, . . . | 59,437 50 | 57,341 24 | - |
| Total, . . . . | . . . . . | $5,831,839 53 | $4,781,435 15 | $64,350 00 |

*Connecticut River. — From 1888 to 1908 inclusive.*

| | | | | |
|---|---|---|---|---|
| Agawam, . . . . | Bank protection, . | $13,000 00 | $11,402 71[2] | - |
| Hadley, . . . . | Bank protection, . | 68,000 00 | 66,641 07[2] | $3,600 00 |
| Hatfield, . . . . | Dikes, . . . . | 7,500 00 | 6,700 75 | - |
| Holyoke, . . . . | Dredging, . . . | 15,000 00 | - | - |
| Investigation of navigation, | - - | 5,500 00 | 1,833 95 | - |
| West Springfield, . . | Bank protection, . | 5,000 00 | 5,051 49[2] | - |
| Total, . . . . | . . . . . | $114,000 00 | $91,629 97 | $3,600 00 |

*Summary.*

| | | | | |
|---|---|---|---|---|
| Small harbors, 1896 to 1908, | - - | $1,202,858 84 | $900,734 40 | $212,375 00 |
| Boston main harbor, 1870 to 1908. | - - | 5,831,839 53 | 4,781,435 15 | 64,350 00 |
| Connecticut River, 1888 to 1908. | - - | 114,000 00 | 91,629 97 | 3,600 00 |
| Totals, . . . . | . . . . . | $7,148,698 37 | $5,773,799 52 | $280,325 00 |

[1] $500 additional by town of Harwich.
[2] A portion paid from general appropriation.
[3] $342,871.91 in addition from income of harbor compensation fund.

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# APPENDIX B.

[See page 4 of this report, *ante*.]

## CONTRACTS MADE AND PENDING DURING THE YEAR 1908.

| No. | Contract No. | Work. | Contractors. | Date. | To be completed. | Condition of Work. | Prices. | Amount. |
|---|---|---|---|---|---|---|---|---|
| 1 | 17 | Anchorage basin, section 1, . | New England & Eastern Dredging Cos. | June 26, 1902, | July 1, 1904, | In progress, | Material dumped at sea, 16.3 cents, scow measure. Material dumped at South Boston, 19.3 cents, scow measure. Material rehandled, 18.5 cents in fill. | $202,000 00 |
| 2 | 18 | Anchorage basin, section 2, . | G. H. Breymann & Bros., assigned to Morris & Cumings Dredging Co. | June 26, 1902, | Apr. 1, 1905, | In progress, | 15 cents per cubic yard, scow measure. | 97,740 00 |
| 3 | 19 | Anchorage basin, section 3, . | G. H. Breymann & Bros., . | June 26, 1902, | July 1, 1904, | Completed, | 15.5 cents per cubic yard, scow measure. | 115,073 70 |
| 4 | 20 | Anchorage basin, section 4, . | G. H. Breymann & Bros., . | June 26, 1902, | July 1, 1904, | Completed, | 16 cents per cubic yard, scow measure. | 122,729 76 |
| 5 | 59 | Improving Menamsha Inlet, | Geo. H. Cavanagh, . . | Aug. 8, 1906, | June 30, 1907, | Completed, | Dredging, 38 cents per cubic yard, scow measure. Quarry grout $2 per ton, chips $1.75 per ton. | 24,029 33 |
| 6 | 65 | Breakwater, Revere, . . | Rockport & Pigeon Hill Granite Cos. | Feb. 18, 1907, | Sept. 1, 1909, | In progress, | $1.13 per ton, . . . . | 54,000 00 |
| 7 | 67 | Dredging Reserved Channel, | G. H. Breymann & Bros., . | Mar. 1, 1907, | July 31, 1908, | Completed, | 18 cents per cubic yard, scow measure. | 85,653 36 |
| 8 | 69 | Dredging west end Bird Island Shoal. | John H. Gerrish, . . . | May 31, 1907, | Nov. 15, 1907, | Completed, | 26 cents per cubic yard, scow measure. | 45,778 98 |
| 9 | 70 | Dredging, West Falmouth, / Dredging, Nantucket, . | John H. Gerrish, . . . | July 15, 1907, | Nov. 1, 1907, | Completed, | 32.7 cents per cubic yard, scow measure. / 27.3 cents per cubic yard, scow measure. | 14,203 18 |
| 10 | 71 | Extending jetties, Cuttyhunk, | Thomas & Connor, . . | Aug. 2, 1907, | Dec. 1, 1907, | Completed, | $2.54 per ton, . . . . | 9,613 90 |
| 11 | 72 | Excavating Rock Creek, . | John H. Gerrish, . . . | Aug. 5, 1907, | June 1, 1908, | In progress, | $5,000, . . . . | 5,000 00 |
| 12 | 73 | Riprap, river bank, Hadley, . | Daniel O'Connell's Sons, . | Aug. 9, 1907, | Dec. 1, 1907, | In progress, | $1.60 per ton, . . . . | 7,200 00 |

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|---|---|---|---|---|---|---|---|---|
| 13 | 74 | Improvement Scorton harbor, | Bay State Dredging Co., | Aug. 19, 1907, | Dec. 1, 1907, | Completed, | Dredging, $6,600. Jetty stone, $1.40 per ton. Riprap stone, $2 per ton. | 9,098 80 |
| 14 | 77 | Widening West Bay cut, Osterville. | John H. Gerrish, | Sept. 6, 1907, | June 1, 1908, | In progress, | Dredging, $6,700. Removing old timber jetty, $250. Moving stone, 50 cents per ton. Jetty stone furnished, $1.90 per ton. Riprap stone furnished, $1.50 per ton. | 9,500 00 |
| 15 | 79 | Dredging, Manchester harbor. | Eastern Dredging Co., | Oct. 18, 1907, | June 1, 1908, | Completed, | 34 cents per cubic yard, scow measure. | 7,650 00 |
| 16 | 80 | Riprap, Third Cliff, Scituate, | Thomas Fitzgibbon, | Nov. 29, 1907, | Apr. 1, 1908, | Completed, | Quarry stone, $2.05 per ton. Bowlders, $1.25 per ton. | 1,761 00 |
| 17 | 81 | Dredging opposite Cunard pier, East Boston. | Eastern Dredging Co., | Mar. 30, 1908, | June 1, 1909, | Completed, | 28.8 cents per cubic yard, scow measure. | 20,988 29 |
| 18 | 82 | Dredging between Savin Hill and Commercial Point. | J. P. O'Riorden, | May 18, 1908, | May 28, 1909, | In progress, | 16½ cents per cubic yard, scow measure. | 16,500 00 |
| 19 | 83 | Sea walls at Scituate, | McHale & Perkins, | Apr. 22, 1908, | July 1, 1908, | Completed, | Wall at Beach Street, $4.65 per foot; wall at Surfside Road, $6.60 per foot; wing wall, $4.60 per foot. | 3,694 04 |
| 20 | 84 | Dike at Herring River, Wellfleet. | Thomas & Connor, | Apr. 24, 1908, | Aug. 1, 1908, | In progress, | $16,250, | 16,250 00 |
| 21 | 85 | Breakwater, Vineyard Haven, | E. S. Belden & Sons, | June 19, 1908, | Oct. 1, 1908, | Completed, | Stone, $1.33 per ton; clamps, $7 each. | 9,792 86 |
| 22 | 86 | Dredging Ipswich River, | Bay State Dredging Co., | July 20, 1908, | Dec. 31, 1908, | Completed, | 45 cents per cubic yard, scow measure. | 2,900 00 |
| 23 | 87 | Dredging East Bay, Osterville. | Cavanagh Bros., | July 17, 1908, | Dec. 1, 1908, | In progress, | $7,000, | 7,000 00 |
| 24 | 89 | Wharf, Penikese Island, | Cahill Construction Co., | Aug. 3, 1908, | Nov. 1, 1908, | In progress, | $4,490, | 4,490 00 |
| 25 | 90 | Dredging at Winthrop, | Bay State Dredging Co., | July 31, 1908, | Dec. 1, 1908, | - | 24½ cents per cubic yard, scow measure. | 4,532 50 |
| 26 | 91 | Dredging at West Falmouth, | John H. Gerrish, | Aug. 14, 1908, | Dec. 31, 1908, | Not commenced. | 38 cents per cubic yard, scow measure. | 8,750 00 |
| 27 | 92 | Dredging in Plymouth harbor. | Eastern Dredging Co., | Sept. 4, 1908, | Oct. 1, 1910, | Not commenced. | Dredging, 16.7 cents per cubic yard, scow measure; dolphins, $120 each. | 117,860 00 |
| 28 | 93 | Dredging Weymouth Fore River. | J. P. O'Riorden, | Sept. 14, 1908, | Dec. 1, 1908, | Completed, | 40 cents per cubic yard, scow measure. | 2,339 20 |
| 29 | 94 | Removing rocks, Rockport harbor. | Thos. Fitzgibbon, | Sept. 14, 1908, | Nov. 30, 1908, | - | $3.98 per ton, | 6,988 88 |
| 30 | 95 | Stone jetty, Sesuit harbor, | William Sears, | Oct. 26, 1908, | Sept. 1, 1909, | Not commenced. | $1.90 per ton, | 7,600 00 |

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